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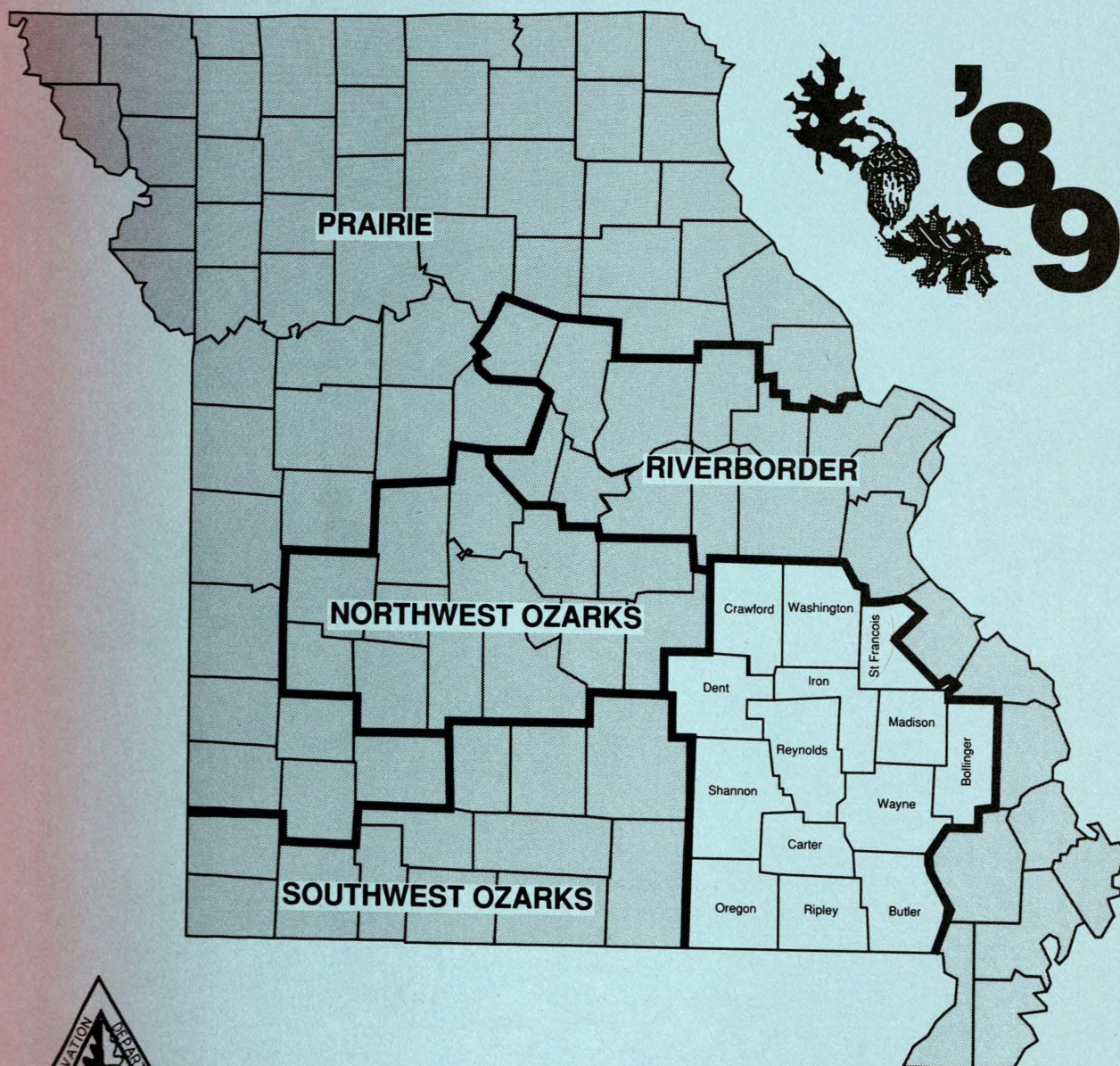
North Central
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Resource
Bulletin NC-115



Timber Resource of Missouri's **Eastern Ozarks**

Earl C. Leatherberry



**North Central Forest Experiment Station
Forest Service—U.S. Department of Agriculture
1992 Folwell Avenue
St. Paul, Minnesota 55108
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This report includes the most commonly used Forest Inventory and Analysis statistics. However, additional forest resource data can be provided to interested users. Persons requesting additional information that can be provided from the raw inventory data are expected to pay the retrieval costs. These costs range from less than \$100 for a relatively simple request to \$2,000 for a complex retrieval involving the services of a Forest Inventory and Analysis computer programmer. Requests will be filled so as to minimize the impact on the Forest Inventory and Analysis Work Unit.

Requests for unpublished information may be directed to:

Project Leader
Forest Inventory and Analysis
North Central Forest Experiment Station
1992 Folwell Avenue
St. Paul, Minnesota 55108
Phone: (612) 649-5140

Area served: Illinois, Indiana, Iowa, Kansas, Michigan,
Minnesota, Missouri, Nebraska, North Dakota,
South Dakota, Wisconsin

Requests for unpublished information from the Missouri
inventory may also be directed to:

State Forester
Missouri Department of Conservation
Forestry Division
P.O. Box 180
Jefferson City, Missouri 65102
Phone: (314) 751-4115

FOREWORD

Forest Inventory and Analysis (FIA) is a continuing endeavor as mandated by the Renewable Forest and Rangeland Resources Planning Act of 1974. Prior inventories were mandated by the McSweeney-McNary Forest Research Act of 1928. The objective of FIA is to periodically inventory the Nation's forest land to determine its extent, condition, and volume of timber, growth, and depletions. Up-to-date resource information is essential to frame intelligent forest policies and programs. USDA Forest Service regional experiment stations are responsible for conducting these inventories and publishing summary reports for individual States. The North Central Forest Experiment Station is responsible for forest resource evaluation in Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin.

Fieldwork for the Missouri Statewide forest inventory was begun in January 1987 and completed in June 1989. Reports on the three previous inventories of Missouri's timber resource are dated 1947, 1959, and 1972.

More accurate survey information was obtained during the 1989 survey than otherwise would have been feasible because of intensified field sampling. Such sampling was made possible by additional funding provided by the Missouri Department of Conservation. The Department also surveyed primary wood-using plants in the State. Data from this survey were used to help estimate the quantity of timber products harvested in the State. Missouri Department of Conservation personnel have also assisted in training field personnel, analyzing information obtained from the survey, and preparing this report.

Aerial photos used in the Missouri Forest Inventory were furnished by the USDA Agricultural Stabilization and Conservation Service and the Missouri Department of Natural Resources Geology and Land Survey.

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Timber Resource of Missouri's Eastern Ozarks

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HIGHLIGHTS

NOTE: *Data from new forest inventories are often compared with data from earlier inventories to determine trends in forest resources. However, for the comparisons to be valid, the procedures used in the two inventories must be similar. As a result of our ongoing efforts to improve the efficiency and reliability of the inventory, several changes in procedures and definitions have occurred since 1972. Because some of these changes will make it inappropriate to directly compare of the 1989 data with those published for 1972, data from the 1972 inventory will be reprocessed using the 1989 procedures and will be published in part in the State statistical report. Please refer to the Appendix section labeled "Comparing Missouri's fourth inventory with the third inventory" for more details.*

General

The Eastern Ozarks Unit consists of 14 counties in southeastern Missouri (see cover). The topography of the area is characterized by alternating ridges and hollows of the Ozark Mountains. Much of the surface of the landscape has been eroded, and the limestone overlying the basic granite has been honeycombed by water percolating through and dissolving rock. The result is many caves, caverns, and sinkholes. The tremendous water-storing capacity of the limestone has resulted in numerous springs in the area.

Forest Area

The Eastern Ozarks Unit contains 4.3 million acres of forest land, which accounts for 70 percent of the total land area in the Unit.

The 4.3 million acres of forest land in the Unit in 1989 represents a modest increase (about 1 percent) since 1972, the year of the last survey.

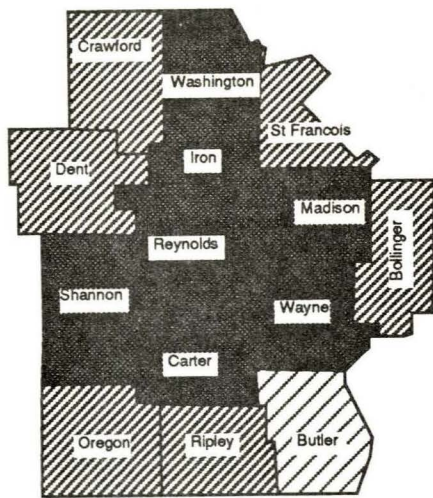
Seven counties in the central and northern portion of the Eastern Ozarks Unit (Carter, Iron, Madison, Reynolds, Shannon, Washington, and Wayne) are more than 75 percent forested (fig. 1).

Ninety-six percent of the forest land (4.1 million acres) is classified as timberland. Between 1972 and 1989, area of timberland in the Unit increased by 26,100 acres, or by less than 1 percent. Some counties in the Unit gained and others lost timberland area between surveys. Gains of 15,000 acres or more occurred in Washington and Wayne counties; losses of 15,000 acres or more occurred in Butler and Oregon counties.

Shannon County contains the largest area of timberland—466,500 acres or 73 percent of the county's land area; followed by Reynolds—425,500 acres or 82 percent of land area; Wayne—386,500 acres or 79 percent of land area; and Washington—375,200 acres or 77 percent of the county's land area.

The Eastern Ozark Unit contains 159,100 acres of reserved forest land, nearly a 62-percent increase over 1972. Counties with the largest

Earl C. Leatherberry is a Geographer with the North Central Forest Experiment Station, St. Paul, MN.



Percent forest

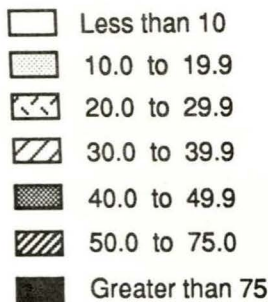


Figure 1.—Forest land as a percent of land area by county, Eastern Ozarks.

areas of reserved forest land are Shannon—58,900 acres; Oregon—25,900 acres; Carter—16,800; and Wayne—16,100 acres. Most of the increase in reserved forest land is related to the legal designation of forest land as public use recreation and preservation areas.

Farmers and miscellaneous private individuals own 2,524,300 acres or 61 percent of the timberland in the Unit (fig. 2).

Black-scarlet oak, the predominant forest type, accounted for 46 percent (1,899,100 acres) of the total timberland. However, area in the black-scarlet oak type declined by nearly 10 percent between surveys. During the same period the white oak type increased by a little over a third, and the area in the maple-beech type increased by about 115 percent (fig. 3).

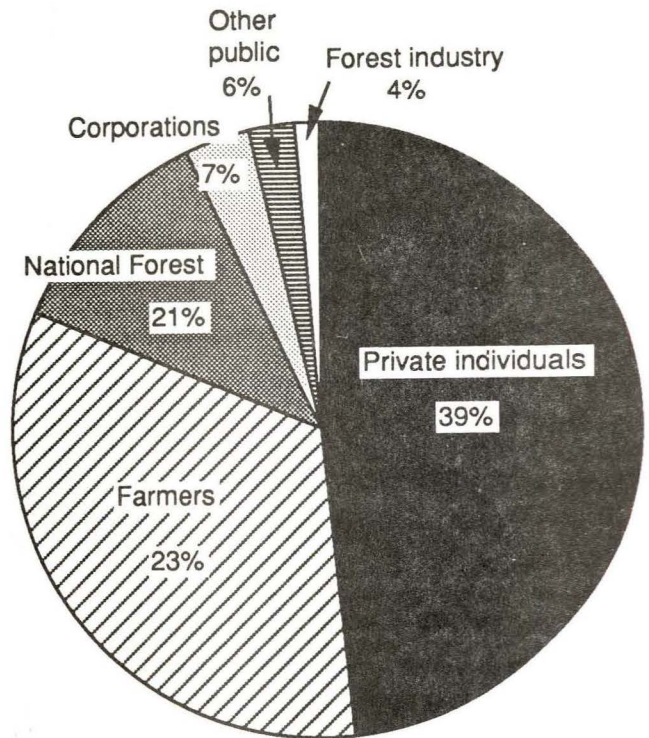


Figure 2.—Area of timberland by owner, Eastern Ozarks, 1989.

Nearly one-half of the Unit's timberland area (48 percent or 1,984,400 acres) is in sawtimber size stands. The remaining area of timberland is about evenly split between poletimber (1,131,100 acres) and sapling and seeding (990,700 acres).

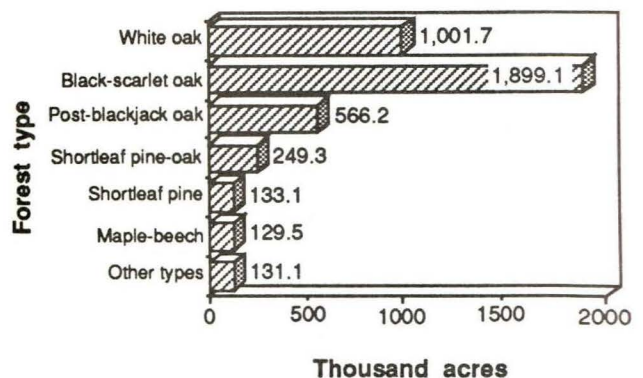


Figure 3.—Area of timberland by forest type, Eastern Ozarks, 1989.

Volume

Volume of growing stock on timberland in the Eastern Ozarks totaled 3.1 billion cubic feet in 1989, or 751 cubic feet per acre.

Oak species account for 71 percent (or 2.2 billion cubic feet) of the growing-stock volume in the Unit (fig. 4).

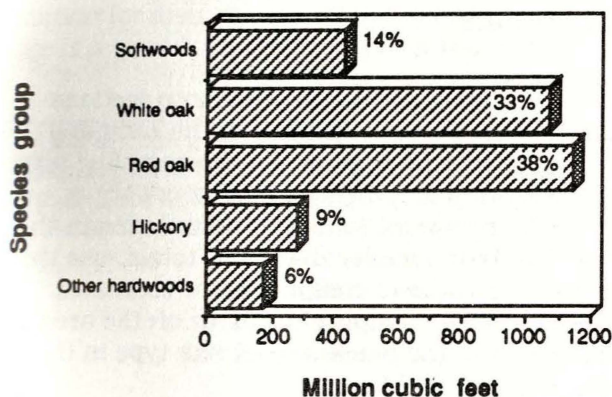


Figure 4.—Growing-stock volume by species group, Eastern Ozarks, 1989.

Sawtimber volume on timberland totaled 8.7 billion board feet in 1989, or 2,125 board feet per acre.

Hardwoods account for 7.1 billion board feet or 82 percent of the net volume of sawtimber on timberland in the Unit (fig. 5).

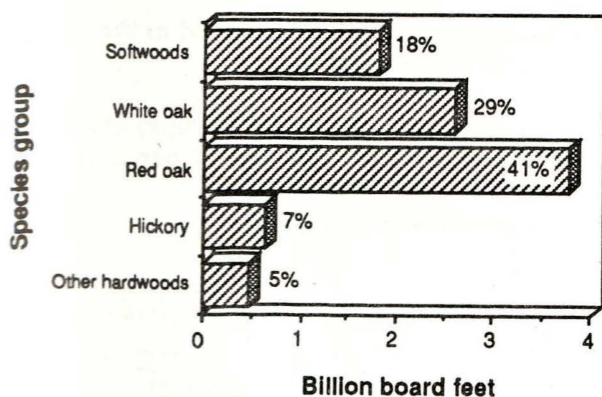


Figure 5.—Sawtimber volume by species group, Eastern Ozarks, 1989.

Oak species total 6.1 billion board feet or 70 percent of the total sawtimber volume.

Stand Condition

Net annual growth of growing stock on timberland in the Eastern Ozarks Unit was 88.9 million cubic feet, 2.9 percent of inventory in 1988.

Net annual growth of growing-stock trees on timberland averaged 21.6 cubic feet per acre in 1988.

Annual mortality of growing stock amounted to 20.3 million cubic feet.

Net annual growth of sawtimber on timberland was 314.4 million board feet.

Annual mortality of sawtimber amounted to 45.3 million board feet.

Timber Use

Timber removals from growing stock totaled 37.4 million cubic feet between 1972 and 1988. Fifty-five percent (20.6 million cubic feet) of the removals from growing stock were trees from the red oak species group (fig. 6).

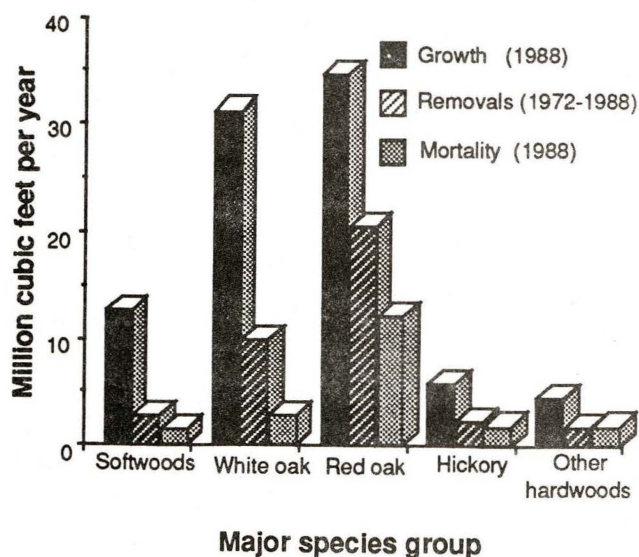


Figure 6.—Growing-stock growth and removals by species group, Eastern Ozarks.

Sawtimber removals totaled 119.3 million board feet between 1972 and 1988.

Oak and hickory growing-stock removals were half that of net annual growth—32.8 million cubic feet to 71.7 million cubic feet.

The oaks accounted for 82 percent (97.6 million board feet) of sawtimber removals between 1972 and 1988.

APPENDIX

ACCURACY OF THE SURVEY

Forest Inventory and Analysis information is based on a sampling procedure designed to provide reliable statistics at the State and Survey Unit levels. Consequently, the reported figures are estimates only. A measure of reliability of these figures is given by sampling errors. These sampling errors mean that the chances are two out of three that if a 100-percent inventory had been taken, using the same methods, the results would have been within the limits indicated.

For example, the estimated growing-stock volume in the Unit in 1989, 3,088.3 million cubic feet, has a sampling error of ± 1.7 percent (± 52.5 million cubic feet). The growing-stock volume from a 100-percent inventory would be expected to fall between 3,035.8 and 3,140.8 million cubic feet ($3,088.3 \pm 52.5$), there being a one in three chance that this is not the case.

The following tabulation shows the sampling errors for the 1989 Eastern Ozarks Forest Inventory:

Item	Unit totals	Sampling error
Growing stock	(Million cubic feet)	(Percent)
Volume (1989)	3,088.3	1.7
Growth (1988)	88.9	2.4
Average annual removals (1972-1988)	37.4	7.5
Sawtimber	(Million board feet)	
Volume (1989)	8,734.4	2.3
Growth (1988)	314.4	3.0
Average annual removals (1972-1988)	119.3	8.6
Timberland	(Thousand acres)	
Area (1989)	4,110.0	0.7

As survey data are broken down into sections smaller than Survey Unit totals, the sampling error increases. For example, the sampling error for timberland area in a particular county is higher than that for total timberland area in the Unit. For data smaller than Unit totals, use the following formula to compute error estimates: For example, to compute the error on the area of timberland in the black-scarlet oak type in the Unit, proceed as follows:

$$E = \frac{(SE) \sqrt{(\text{Unit total area or volume})}}{\sqrt{(\text{Volume or area smaller than Unit total})}}$$

where: E = sampling error in percent
SE = Unit total error for area or volume

The total area of black-scarlet oak type in the Unit from table 3 = 1,899,100 acres

The total area of all timberland in the Unit from table 3 = 4,110,000

The Unit total error for timberland area from the preceding tabulation = 0.7 percent

Using the above formula:

$$\begin{aligned} \text{Error} &= \frac{(0.7) \sqrt{4,110,000}}{\sqrt{1,899,100}} \\ &= \pm 1.03 \text{ percent} \end{aligned}$$

SURVEY PROCEDURES

The 1989 Missouri survey used a growth model-enhanced, two-phase sample design. This sampling scheme and associated estimators are similar to sampling with partial replacement (SPR) in that a set of randomly located plots is available for remeasurement and a random set of new plots is established and measured. A significant feature of the new Missouri design is stratification for disturbance on the old sample and use of a growth model to improve regression

¹ Shifley, S.F. 1987. *A generalized system of models forecasting Central States tree growth*. Res. Pap. NC-279. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 10 p.

estimates made on old undisturbed forest plots (fig. 7). The growth model used in the Missouri survey design was the Central States Stand and Tree Evaluation and Modeling System (STEMS)¹.

The major steps in the new survey design were as follows:

1. Aerial photography (Phase 1)

In this phase two sets of random points were located on current aerial photography: a set of new photo plots and a set of relocated old photo plots (ground plot locations from the previous inventory). Photos were 1:20,000 and 1:40,000 scale black and white panchromatic prints provided by the ASCS and the Missouri Department of Natural Resources Geology and Land

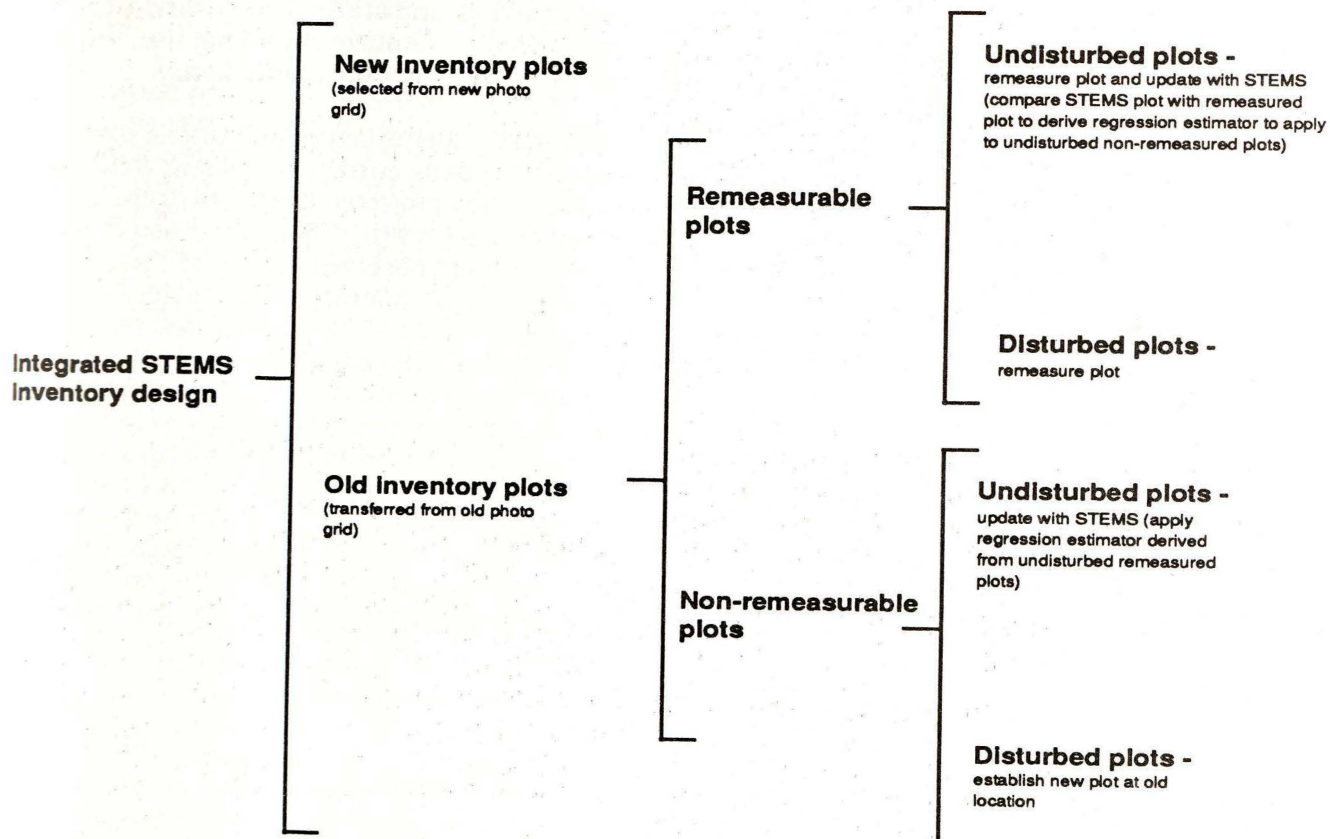


Figure 7.—Overview of the Missouri sample design.

Survey. The year of photography for each county in the Unit is shown below.

County	Date	County	Date
Bollinger	1981	Oregon	1981
Butler	1981	Reynolds	1982
Carter	1981	Ripley	1982
Crawford	1981	St. Francois	1981
Dent	1981	Shannon	1981
Iron	1982	Washington	1981
Madison	1981	Wayne	1981

The locations of the plots used in the 1972 inventory were transferred to these new photographs. The photographs were then assembled into township mosaics, and a systematic grid of 121 1-acre photo plots (each plot representing approximately 190.4 acres) was overlaid on each township mosaic. Each of these plots (both the new systematic grid points and the old sample plots) was examined by aerial photogrammetrists and classified stereoscopically based on land use. If trees were present, forest type and stand size-density class were recorded. Then all the old sample locations and a sample of the new photo plots were sent to the field for the field crew to verify the photo classification and to take further measurements. In all, 32,370 photo plots (30,739 new and 1,631 old) were examined stereoscopically, as shown in the following tabulation.

Photo land class	Photo plots
Timberland	22,095
Reserved timberland	766
Questionable	513
Nonforest with trees	1,073
Nonforest without trees	7,791
Water	132
All classes	32,370

2. Plot measurements (Phase 2)

On plots classified as timberland, wooded pasture, or windbreak (at least 120 feet wide), a ground plot was established, remeasured, or

modelled. A ground plot consists of a 10-point cluster covering approximately 1 acre. At each point, trees 5.0 inches or more in d.b.h. were sampled on a 37.5 Basal Area Factor (BAF) variable-radius plot, and trees less than 5.0 inches d.b.h. were sampled on a 1/300-acre fixed-radius plot.

From the new photo plots, a random sample of ground plots was established and measures of land use, volume, mortality and cutting were recorded. These locations were monumented for future remeasurement. The procedures for the old inventory photo plots (old plot locations) was somewhat different. Old plots were classed as remeasurable (monumented) or nonremeasurable (not monumented and thus difficult to relocate in the field). Within both of these groups, old plots can additionally be identified as undisturbed or disturbed. Ground plots corresponding to remeasurable old inventory photo plots that were classified as undisturbed forest land were remeasured to obtain current land use, volume, growth and removals information.

All forest undisturbed remeasurable plots were projected to the current time using STEMS, which yields projected estimates of current volume and growth. The comparison of the projected and observed values for these plots provided local calibration data to adjust the projected values of the undisturbed nonremeasurable plots. The adjustment procedure is described by Smith² in a separate publication. All disturbed remeasurable plots were remeasured on the ground to assess changes since the last inventory. Disturbance as used here refers to any change on a plot that can be detected on aerial photos and that the STEMS growth processor cannot predict, such as catastrophic mortality, cutting, seedling stands, and land use change.

² Smith, W. Brad. 1983. *Adjusting the STEMS regional growth models to improve local predictions*. Res. Note NC-297. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 5 p.

Although not monumented during the 1972 inventory, nonremeasurable forest points play a crucial role in the new survey design. These points were carefully examined, comparing past and current aerial photography to determine which plots were undisturbed and which had conditions that could be simulated by STEMS. For those plots that could be updated, past and current photography was examined to determine that only normal growth and mortality had occurred. STEMS was then used to "grow" the old plot and tree data to produce an estimate of current data. Thus these points became ground plots even though the information was obtained without actually visiting the plot. The plot record for each updated plot was sent to the field for verification of current ownership information. For points classified as disturbed, a new ground plot was established as close to the old location as possible. This allows information about land use trends to be recorded even though the old plot cannot be exactly located for remeasurement.

The estimation procedure for computing statistics from this sampling design was more complicated than the simple two-phase estimation procedure used in the past. In fact, this procedure yielded two independent samples, one coming from the new photo points and the other coming from the old photo points that are remeasured or updated. The tabulation below

summarizes the distribution of ground plots for the new inventory design.

3. Area estimates

Area estimates were made using two-phase estimation methods. In this type of estimation, a preliminary estimate of area by land use is made from the aerial photographs (phase 1) and corrected by the plot measurements (phase 2). A complete description of this estimation method is presented by Loetsch and Haller (1964)³.

4. Volume estimates

Estimates of volume per acre are made from the trees measured or modelled on the 10-point plots. Estimates of volume per acre were multiplied by the area estimates to obtain estimates of total volume. Net cubic foot volumes are based on equations developed by Hahn and Hansen (In prep.)⁴ for use in the Central States.

³ Loetsch, F., Haller, K.E. 1964. *Forest inventory, volume I, statistics of forest inventory and information from aerial photographs*. BLV Verlagsgesellschaft Munch Basle Vienna. 436 p.

⁴ Hahn, Jerold T.; Hansen, Mark H. (In prep.). *Tree volume equations for the Central States*. Res. Pap. NC-St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station.

Ground land use class	Old plots remeasured	Old plots updated	Old plots replaced	New plots	Total plots
Timberland	480	262	1,306	361	1,409
Reserved timberland	11	2	4	140	157
Woodland	6	1	4	2	13
Reserved woodland	1	0	0	0	1
Nonforest with trees	22	16	24	30	92
Nonforest without trees	160	293	29	145	627
Census water	5	2	3	9	19
Total	685	576	1,370	672	2,318

The Forest Service reports all board foot volume in International 1/4-inch rule. Conversion factors for local use rules are often useful. Board foot Doyle conversion factors were derived from full tree measurements taken throughout the Central States (Illinois, Indiana, Iowa, and Missouri), and an equation was developed by Wiant and Castenaeda (1977)⁵. Factors (multipliers) to convert board foot international volumes in this report to Doyle board feet by diameter class and softwoods and hardwoods are shown in the following tabulation:

D.B.H. (Inches)	Doyle rule conversion factor	
	Softwoods	Hardwoods
9.0-10.9	0.3455	—
11.0-12.9	0.4780	0.4172
13.0-14.9	0.5992	0.5118
15.0-16.9	0.6908	0.5882
17.0-18.9	0.7685	0.6569
19.0-20.9	0.8573	0.7180
21.9-22.9	0.8645	0.7829
23.0-24.9	0.9276	0.8324
25.0-26.9	0.9493	0.8736
27.0-28.9	0.9710	0.9473
29.0+	1.1065	1.1349

5. Growth and mortality estimates

On remeasurement plots, estimates of growth and mortality per acre come from the remeasured diameters of trees and from observation of trees that died between inventories. Growth is reported for 1988, the last year before the inventory, and is based on an assumption of constant basal area growth over there measurement period. Mortality is reported for 1988 also, and is based on an assumption of constant volume mortality over the remeasurement period. On new plots, where trees were not remeasured, estimates of growth and mortality were obtained by using STEMS to project the growth and mortality of trees for 1 year. Growth and mortality estimates for old undisturbed plots that were

updated were derived in the same manner as remeasured plots. The STEMS growth model was adjusted by Survey Unit to meet local conditions. As with volume, total growth and mortality estimates were obtained by multiplying the per acre estimates by area estimates.

6. Average annual removals estimates

Average annual growing-stock and sawtimber removals (1972 to 1988) were estimated from only the remeasurement plots. These estimates were obtained from trees measured in the last survey and cut or otherwise removed from the timberland base. New plots were not used to estimate removals. Because remeasurement plots make up about one-half of the total ground plots, average annual removals estimates have greater sampling errors than volume and growth estimates.

COMPARING MISSOURI'S FOURTH INVENTORY WITH THE THIRD INVENTORY

The following paragraphs highlight some of the procedural changes since the last inventory to assist the reader in analyzing data from this report:

New volume equations were developed for the Central States, and these equations were used to compute the 1989 volumes and also to recompute the 1972 volume for growth calculations. Although the adjustment differs by Survey Unit the recomputed 1972 growing-stock and board foot volumes will generally be greater than those shown in the 1972 report.

Mortality figures published in the 1972 inventory report were based on field estimates from a limited number of remeasurement plots. Information gathered on a larger number of remeasurement plots during the current inventory was used to adjust the 1972 mortality figures. This adjustment will also affect the estimate of net growth for the 1972 inventory.

⁵ Wiant, Harry V., Jr.; Castenaeda, Froylan.. 1977. *Mesavage and Girard's volume tables formulated.* BLM4. Denver, CO: U.S. Department of Interior, Bureau of Land Management, Denver Service Center: 1-4.

Past surveys used only growing-stock trees to determine stand-size class. Current survey procedures require that stand-size class be determined on the basis of all live trees. Therefore, direct comparisons of current inventory data to old inventory data by stand-size class may be misleading.

The basic building block for estimating forest area and timber volume has been changed from the Survey Unit to the county. In the past, the statistics were developed at the Unit level and prorated back to the county on the basis of photo-interpretation points. Direct development of county-level data helps users interested in more precise local data, but can make the outcome of comparisons with past estimates uncertain.

LOG GRADE

In Missouri the butt log of every sawtimber sample tree was graded for quality on approximately one-third of the sample plots. The volume yield by log grade for species in this sample was used to distribute the volume of trees in the ungraded sample into log-grade classes by species group.

Logs were graded on the basis of external characteristics as indicators of quality. Hardwood species were graded according to "A guide to hardwood log grading" (1973)⁶. The best 12-foot section of the lowest 16-foot hardwood log, or the best 12-foot upper section if the butt log did not meet minimum log-grade standards, was graded as follows:

⁶ Rast, Everette D.; Sonderman, David L.; Gammon, Glenn L. 1973. *A guide to hardwood log grading*. Gen. Tech. Rep. NE-1. Upper Darby, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 31 p.

Forest Service standard grades for hardwood factory saw logs

Grading factors		Specifications							
		Log grade 1			Log grade 2				Log grade 3
		Butts only	Butts & uppers		Butts & uppers				Butts & uppers
Position in tree									
Scaling diameter, inches		13-15 ¹	16-19	20+	11+ ²	12+			8+
Length without trim, feet			10+		10+	8-9	10-11	12+	8+
Required clear cuttings ³ of each of three best faces ⁴	Min. length, feet	7	5	3	3	3	3	3	2
	Max. number	2	2	2	2	2	2	3	No limit
	Min. proportion of log length required in clear cutting	5/6	5/6	5/6	2/3	3/4	2/3	2/3	1/2
Maximum sweep & crook allowance	For logs with less than one-fourth of end in sound defects		15 percent				30 percent		50 percent
	For logs with more than one-fourth of end in sound defects		10 percent				20 percent		35 percent
Maximum scaling deduction			40 percent ⁵				50 percent ⁶		50 percent

¹ Ash and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.

² Ten-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.

³ A clear cutting is a portion of a face, extending the width of the face, that is free of defects.

⁴ A face is one-fourth of the surface of the log as divided lengthwise.

⁵ Otherwise #1 logs with 41- to 60-percent deductions can be #2.

⁶ Otherwise #2 logs with 51- to 60-percent deductions can be #3.

Forest Service standard specifications for hardwood construction logs (tie and timber logs)¹

Position in tree	Butts and uppers
Min. diameter, small end	8 inches +
Min. length without trim	8 feet
Clear cuttings	No requirements
Sweep allowance	One-fourth of the diameter at the small end for each 8 feet of length.

Sound surface defects:

Single knots	Any number, if no one knot has an average diameter above the callus in excess of one-third of the log diameter at point of occurrence.
Whorled knots	Any number, if the sum of knot diameters above the callus does not exceed one-third of the log diameter at point of occurrence.
Holes	Any number provided none has a diameter over one-third of the log diameter at point of occurrence, and none extends more than 3 inches into included timber ² .

Unsound surface defects :	Same requirements as for sound defects if they extend into included timber. No limit if they do not.
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End defects:

Sound	No requirements.
Unsound	None allowed; log must be sound internally, but will admit one shake not to exceed one-fourth the scaling diameter and will admit one longitudinal split not extending more than 5 inches into included timber.

¹These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only nonfactory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, it may be necessary to subdivide the class into grades.

²Included timber is always square, and dimension is judged from small end.

Log grades for southern pine logs

Grade 1: logs with three or four clear faces¹ and 16 inches minimum d.i.b.

Grade 2: logs with one or two clear faces and 12 inches minimum d.i.b.

Grade 3: logs with no clear faces and 6 inch minimum d.i.b.

After the tentative log grade is established from above, the log will be degraded one grade for each of the following, except that no log can be degraded below grade 3. Net scale after deduction for defect must be at least 50 percent of the gross contents of the log.

1. **Sweep.** Degrade any tentative 1 or 2 log one grade if sweep amounts to 3 or more inches and equals or exceeds one-third of the diameter inside bark at small end.
2. **Heart rot.** Degrade any tentative 1 or 2 log one grade if conk, massed hyphae, or other evidence of advanced heart rot is found anywhere in it.

¹A face is one-fourth of the circumference in width extending full length of the log. Clear faces are those free of: knots measuring more than 1 inch in diameter, overgrown knots of any size, and holes more than one inch in diameter. Faces may be rotated to obtain the maximum number of clear ones.

Log grades for eastern redcedar (Missouri special use)

Position in tree	Butts and uppers
D.B.H.	6 inches +
Min. diameter(ob), small end	5 inches +
Length without trim	7 feet
Clear cuttings	No requirements
Sweep allowance	Reasonably straight

Sound surface defects permitted:

Single knot	Any number less than one-half of the log diameter at point of occurrence.
Whorled knots	Any number provided the sum of the diameter of knots 2 inches or larger in a 1-foot section does not exceed the diameter at that point.

Unsound defects permitted:	Any number, provided defect is not greater than one-half of the volume at any one point of occurrence.
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METRIC EQUIVALENTS OF UNITS USED IN THIS REPORT

1 acre = 4,046.86 square meters or 0.405 hectare.
 1,000 acres = 405 hectares.
 1 cubic foot = 0.0283 cubic meter.
 1 foot = 30.48 centimeters or 0.3048 meter.
 1 inch = 25.4 millimeters, 2.54 centimeters, or 0.0254 meter.
 1 pound = 0.454 kilograms.
 1 ton = 0.907 metric tons.

TREE SPECIES GROUPS IN MISSOURI⁷

SOFTWOODS

Shortleaf pine *Pinus echinata*
 Virginia pine *Pinus virginiana*
 Baldcypress *Taxodium distichum*
 Eastern redcedar *Juniperus virginiana*
 Other softwoods

Scotch pine *Pinus sylvestris*

HARDWOODS

Select white oak⁸

White oak *Quercus alba*

Swamp white oak *Quercus bicolor*

Bur oak *Quercus macrocarpa*

Swamp chestnut oak *Quercus michauxii*

Chinkapin oak *Quercus muehlenbergii*

Other white oak⁸

Overcup oak *Quercus lyrata*

Chestnut oak *Quercus prinus*

Post oak *Quercus stellata*

Select red oak⁸

Cherrybark oak *Quercus falcata*
 var. *pagodifolia*

Northern red oak *Quercus rubra*

Shumard oak *Quercus shumardii*
 var. *shumardii*

Other red oak⁸

Scarlet oak *Quercus coccinea*

Northern pin oak *Quercus ellipsoidalis*

Southern red oak *Quercus falcata*

Shingle oak *Quercus imbricaria*

Black oak *Quercus velutina*

Blackjack oak *Quercus marilandica*

Pin oak *Quercus palustris*

Willow oak *Quercus phellos*

Select hickory⁸

Pecan *Carya illinoensis*

Shellbark hickory *Carya laciniosa*

Shagbark hickory *Carya ovata*

Mockernut hickory *Carya tomentosa*

Other hickory⁸

Bitternut hickory *Carya cordiformis*

Pignut hickory *Carya glabra*

Black hickory *Carya texana*

River birch⁸ *Betula nigra*

Hard maple⁸

Sugar maple *Acer saccharum*

Soft maple⁹

Red maple *Acer rubrum*

Silver maple *Acer saccharinum*

Ash⁸

Blue ash *Fraxinus quadrangulata*

White ash *Fraxinus americana*

Green ash *Fraxinus pennsylvanica*

Cottonwood⁹ *Populus deltoides*

Basswood⁹ *Tilia americana*

Beech⁸ *Fagus grandifolia*

Black walnut⁸ *Juglans nigra*

Black cherry⁹ *Prunus serotina*

Butternut⁹ *Juglans cinerea*

Elm

Winged elm⁹ *Ulmus alata*

American elm⁹ *Ulmus americana*

Slippery elm⁹ *Ulmus rubra*

Rock elm⁸ *Ulmus thomasi*

Hackberry⁹ *Celtis occidentalis*

Sycamore⁹ *Platanus occidentalis*

Yellow-poplar⁹ *Liriodendron tulipifera*

Black willow⁹ *Salix nigra*

Sweetgum⁹ *Liquidambar styraciflua*

Tupelo⁹

Black tupelo *Nyssa sylvatica*
 var. *sylvatica*

Swamp tupelo *Nyssa sylvatica*
 var. *biflora*

Persimmon⁸ *Diospyros virginiana*

Sassafras⁹ *Sassafras albidum*

Other hardwoods

Ohio buckeye⁹ *Aesculus glabra*

Boxelder⁹ *Acer negundo*

Kentucky coffeetree⁸ *Gymnocladus dioica*

Black locust⁸ *Robinia pseudoacacia*

White mulberry⁹ *Morus alba*

Red mulberry⁹ *Morus rubra*

Honeylocust⁸ *Gleditsia triacanthos*

Northern catalpa⁸ *Catalpa speciosa*

⁷ The common and scientific names are based on: Little, Elbert L. 1979. Check list of native and naturalized trees of the United States. Agric. Handb. 541. Washington, DC: U.S. Department of Agriculture, Forest Service. 375 p.

⁸ This species or species group is considered a hard hardwood, with an average specific gravity greater than 0.50.

⁹ This species or species group is considered a soft hardwood, with an average specific gravity of 0.50 or less.

Noncommercial species

Osage-orange	<i>Maclura pomifera</i>
Eastern hophornbeam	<i>Ostrya virginiana</i>
Apple	<i>Malus</i> spp.
American hornbeam	<i>Carpinus caroliniana</i>
Wild plum	<i>Prunus</i> spp.
Eastern redbud	<i>Cercis canadensis</i>
Pawpaw	<i>Asimina triloba</i>
Hawthorn	<i>Crataegus</i> spp.

DEFINITION OF TERMS

Average annual removals from growing stock.

—The average net growing-stock volume in growing-stock trees removed annually for forest products (including roundwood products and logging residues) and for other uses (see Other removals). Average annual removals of growing stock are reported for a period of several years (1972 to 1988 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures in Appendix).

Average annual removals from sawtimber.—

The average net board foot sawtimber volume of live sawtimber trees removed annually for forest products (including roundwood products and other uses [see Other removals]). Average annual removals of sawtimber are reported for a period of several years (1972 to 1988 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures in Appendix).

Basal area.—The area in square feet of the cross section at breast height of a single tree. When the basal area of all trees in a stand is summed, the result is usually expressed as square feet of basal area per acre.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, osage-orange, and redbud.)

Commercial forest land.—(See Timberland).

Cord.—One standard cord is 128 cubic feet of stacked wood, including bark and air space. Cubic feet can be converted to standard cords by dividing by 79.

County and municipal land.—Land owned by counties and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

Cropland.—Land under cultivation within the past 24 months; including cropland harvested, crop failures, cultivated summer fallow, idle cropland used only for pasture, orchards, and land in soil improvement crops, but excluding land cultivated in developing improved pasture.

Cull.—Portions of a tree that are unusable for industrial wood products because of rot, missing or dead material, or other defect.

Diameter class.—A classification of trees based on diameter outside bark, measured at breast height (d.b.h.). Two-inch diameter classes are commonly used in Forest Inventory and Analysis, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h.

Diameter at breast height (d.b.h.).—The outside bark diameter at 4.5 feet (1.37 m) above the forest floor on the uphill side of the tree. For determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

Farm.—Any place from which \$1,000 or more of agricultural products were produced and sold during the year.

Farmer-owned land.—Land owned by farm operators whether part of the farmstead or not. (Note: Excludes land leased by farm operators from nonfarm owners, such as railroad companies and States.)

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide. (See Tree, Land, Timberland, Reserved forest land, Other forest land, Stocking, and Water.)

Forest industry land.—Land owned by companies or individuals that operate a primary wood-using plant.

Forest type.—A classification of forest land based on the species forming a plurality of live tree stocking. Major forest types in the State are:

Shortleaf pine.—Forests in which shortleaf pine comprises a plurality of the stocking. (Common associates include oak, hickory, and gum.)

Eastern redcedar.—Forests in which eastern redcedar comprises a plurality of the stocking. (Common associates include oak and hickory.)

Eastern redcedar-hardwood.—Forests in which hardwoods (usually upland oaks), comprise a plurality of the stocking but where eastern redcedar comprises 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Shortleaf pine-oak.—Forests in which hardwoods (usually white, scarlet, chestnut, northern red, or black oaks), singly or in combination, comprise a plurality of the stocking but where shortleaf pine comprises 25 to 50 percent of the stocking.

Post-blackjack oak.—Forests in which post or blackjack oaks, singly or in combination, comprise a plurality of the stocking, and less than 25 percent of the stocking is in pines or eastern redcedar.

Black-scarlet oak.—Forests in which black oak or scarlet oaks, singly or in combination, comprise a plurality of the stocking, and less than 25 percent of the stocking is in pines or eastern redcedar. (Common associates include yellow-poplar, elm, maple, and black walnut.)

White oak.—Forests in which white oak species, singly or in combination, comprise a plurality of the stocking, and less than 25 percent of the stocking is in pines or eastern redcedar.

Oak-gum-cypress.—Bottomland forests in which bottomland oaks such as pin, swamp white, and shingle oaks along with tupelo, blackgum, sweetgum, or cypress, singly or in combination, comprise a plurality of the stocking. (Common associates include cottonwood, willow, ash, elm, hackberry, and maple.)

Elm-ash-soft maple.—Forests in which lowland elm, ash, soft maple, and cottonwood, singly or in combination, comprise a plurality of the stocking. (Common associates include boxelder, willow, sycamore, and beech.)

Cottonwood.—Forests in which cottonwood comprises at least 50 percent of the stocking. (Associates include willow, elm, soft maple, and ash.)

Maple-beech.—Forests in which hard maple or beech, singly or in combination, comprises a plurality of the stocking. (Common associates include soft maple, elm, and basswood.)

Growing-stock tree.—A live tree of commercial species that meets specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

Growing-stock volume.—Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over, from 1 foot above the ground to a minimum 4.0-inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs.

Hard hardwoods.—Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and ash.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous. (See Soft hardwoods and Hard hardwoods.)

Idle farmland.—Includes former cropland, orchards, improved pastures, and farm sites not tended within the past 2 years and presently less than 16.7 percent stocked with trees.

Improved pasture.—Land currently improved for grazing by cultivating, seeding, irrigating, or clearing of trees or brush and less than 16.7 percent stocked with live trees.

Industrial wood.—All roundwood products, except fuelwood.

Land.—A. *Bureau of the Census.* Dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than one-eighth of a statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

B. *Forest Inventory and Analysis.* The same as the Bureau of the Census, except minimum width of streams, etc., is 120 feet and minimum size of lakes, etc., is 1 acre.

Log grade.—A log classification based on external characteristics as indicators of quality or value. (See Appendix for specific grading factors used.)

Marsh.—Nonforest land that characteristically supports low, generally herbaceous or shrubby vegetation and that is intermittently covered with water.

Merchantable.—Refers to a pulpwood or saw-log section that meets pulpwood or saw-log specifications, respectively.

Miscellaneous Federal land.—Federal land other than National Forest and land administered by the Bureau of Land Management or Bureau of Indian Affairs.

Miscellaneous private land.—Privately owned land other than forest-industry and farmer-owned land.

Mortality.—The volume of sound wood in growing-stock and sawtimber trees that die annually.

National Forest land.—Federal land that has been legally designated as National Forest or purchase units, and other land administered by the USDA Forest Service.

Net annual growth of growing stock.—The annual change in volume of sound wood in live sawtimber and poletimber trees and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes.

Net annual growth of sawtimber.—The annual change in the volume of live sawtimber trees and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes.

Net volume.—Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, power-line clearings of any width, and 1- to 40-acre areas of water classified by the Bureau of the Census as land. If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre in area to qualify as nonforest land.)

a. *Nonforest land without trees.*—Nonforest land with no live trees present.

b. *Nonforest land with trees.*—Nonforest land with one or more trees per acre at least 5 inches d.b.h.

Nonstocked land.—Forest land less than 16.7 percent stocked with all live trees.

Other forest land.—Forest land not capable of producing 20 cubic feet per acre per year of industrial wood crops under natural conditions and not associated with urban or rural development. These sites often contain tree species that are not currently utilized for industrial wood production or trees of poor form, small size, or inferior quality that are unfit for industrial products. Unproductivity may be the result of adverse site conditions such as sterile soil, dry climate, poor drainage, high elevation, and rockiness. This land is not withdrawn from timber utilization.

Pasture.—Land presently used for grazing or under cultivation to develop grazing.

Pastured timberland.—Timberland for which the primary use is wood production, but is presently used for grazing.

Physiographic class.—A measure of soil and water conditions that affect tree growth on a site. The physiographic classes are:

Xeric sites.—Very dry soils where excessive drainage seriously limits both growth and species occurrence. Example: cedar barrens.

Xeromesic sites.—Moderately dry soils where excessive drainage limits growth and species occurrence to some extent. Example: dry oak ridge.

Mesic sites.—Deep, well-drained soils. Growth and species occurrence are limited only by climate.

Hydromesic sites.—Moderately wet soils where insufficient drainage or infrequent flooding limits growth and species occurrence to some extent. Example: better drained bottomland hardwood sites.

Hydric sites.—Very wet sites where excess water seriously limits both growth and species occurrence. Example: frequently flooded river bottoms and cypress swamps.

Poletimber stand.—(See Stand-size class.)

Poletimber tree.—A growing-stock tree of commercial species at least 5.0 inches d.b.h. but smaller than sawtimber size.

Reserved forest land.—Forest land withdrawn from timber utilization through statute, administrative regulation, designation, or exclusive use for Christmas tree production, as indicated by annual shearing.

Rotten tree.—A tree that does not meet regional merchantability standards because of excessive unsound cull. May include noncommercial tree species.

Rough tree.—A tree that does not meet regional merchantability standards because of excessive sound cull. May include noncommercial tree species.

Salvable dead tree.—A standing or down dead tree considered merchantable by regional standards.

Sapling.—A live tree 1.0 to 5.0 inches d.b.h.

Sapling-seedling stand.—(See Stand-size class.)

Saw log.—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter outside bark (d.o.b.) for softwoods of 7.0 inches (9.0 inches for hardwoods) or other combinations of size and defect specified by regional standards.

Saw-log portion.—That part of the bole of sawtimber trees between the stump and the saw-log top.

Saw-log top.—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber stand.—(See Stand-size class.)

Sawtimber tree.—A growing-stock tree of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. Hardwoods must be at least 11.0 inches d.b.h.

Sawtimber volume.—Net volume of the saw-log portion of live sawtimber in board feet, International 1/4-inch rule (unless specified otherwise) from stump to a minimum 7.0 inches top d.o.b. for softwoods and a minimum 9.0 inches top d.o.b. for hardwoods.

Seedling.—A live tree less than 1.0 inch d.b.h. that is expected to survive. Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

Short-log (rough tree).—Sawtimber-size trees of commercial species that contain at least one merchantable 8- to 11-foot saw log but not a 12-foot saw log.

Site class.—A classification of forest lands in terms of inherent capacity to grow crops of industrial wood. The class identifies the potential growth in merchantable cubic feet/acre/year at culmination of mean annual increment of fully stocked natural stands.

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Soft hardwoods.—Hardwood species with an average specific gravity less than 0.50 such as gum, yellow-poplar, cottonwood, red maple, basswood, and willow.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Stand.—A group of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Stand-age class.—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Stand-size class.—A classification of stocked (see Stocking) forest land based on the size class of live trees on the area; that is, sawtimber, poletimber, or seedlings and saplings.

Sawtimber stands.—Stands with half or more of live stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands with half or more live stocking in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.—Stands with more than half of the live stocking in saplings and/or seedlings.

State land.—Land owned by States or leased to them for 50 years or more.

Stocking.—The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5.0 inches d.b.h. and larger. In a stand of trees less than 5.0 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5.0 inches d.b.h.

Stands are grouped into the following stocking classes:

Overstocked stands.—Stands in which stocking of live trees is 133 percent or more.

Fully stocked stands.—Stands in which stocking of trees is from 100.0 to 132.9 percent.

Medium stocked stands.—Stands in which stocking of trees is from 60.0 to 99.9 percent.

Poorly stocked stands.—Stands in which stocking of trees is from 16.7 to 59.9 percent.

Nonstocked areas.—Commercial forest land on which stocking of trees is less than 16.7 percent.

Timberland.—Forest land that is producing or capable of producing in excess of 20 cubic feet per acre per year of industrial wood crops under natural conditions, that is not withdrawn from timber utilization, and that is not associated with urban or rural development. Currently inaccessible and inoperable areas are included.

Tree.—A woody plant usually having one or more perennial stems, a more or less definitely formed crown of foliage, and a height of at least 12 feet at maturity.

Tree size class.—A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, saplings, and seedlings.

Upper stem portion.—That part of the bole of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches outside bark or to the point where the central stem breaks into limbs.

Urban and other areas.—Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; or other nonforest land not included in any other specified land use class.

Urban forest land.—Forest land closely associated with or in such proximity to urban nonforest land uses that is not likely to be managed for the production of industrial wood products on a continuing basis. Wood removed would be for land clearing, fuelwood, or aesthetic purposes. Such forest land may be associated with industrial, commercial, residential, or recreational nonforest uses. Residential subdivisions, industrial parks, golf course perimeters, airport buffer strips, and public urban parks that qualify as forest land are included.

Water.—Water Areas. Areas within a land mass persistently covered by water.

(a) *Bureau of the Census.*—Permanent inland water surfaces, such as lakes, reservoirs, and ponds at least 40 acres in area; and streams, sloughs, estuaries, and canals at least one-eighth of a statute mile wide.

(b) *Noncensus.*—Permanent inland water surfaces, such as lakes, reservoirs, and ponds from 1 to 39.9 acres in area; and streams, sloughs, estuaries, and canals from 120 feet to one-eighth of a statute mile wide.

Windbreak.—A group of trees whose primary use is to protect buildings currently in use.

Wooded pasture.—Improved pasture with more than 16.7 percent stocking in live trees but less than 25 percent stocking in growing-stock trees. Area is currently improved for grazing or there is other evidence of grazing.

Wooded strip.—An acre or more of natural continuous forest land that would otherwise meet survey standards for timberland except that it is less than 120 feet wide.

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Table 1.--Area of land by county and major land-use class, Eastern Ozarks Unit, Missouri, 1989

(In thousand acres)

County	Land area	Forest land					Nonforest land with trees	Nonforest land with trees, as a percent of land area
		All forest land	Timberland	Timberland as a percent of land area	Reserved forest land	Other forest land		
Bollinger	397.2	215.5	215.5	54.3	--	--	6.2	1.6
Butler	446.7	136.7	130.7	29.3	6.0	--	19.2	4.3
Carter	325.8	283.2	266.4	81.8	16.8	--	6.4	2.0
Crawford	475.9	325.4	321.9	67.6	--	3.5	25.7	5.4
Dent	483.1	308.8	302.4	62.6	4.4	2.0	24.6	5.1
Iron	353.3	291.0	275.9	78.1	8.4	6.7	19.6	5.5
Madison	318.2	249.4	239.6	75.3	6.8	3.0	2.6	0.8
Oregon	506.9	318.5	292.6	57.7	25.9	--	32.6	6.4
Reynolds	517.4	429.4	425.5	82.2	3.9	--	18.0	3.5
Ripley	404.2	269.0	269.0	66.6	--	--	20.8	5.1
St. Francois	288.7	160.9	142.3	49.3	10.4	8.2	8.4	2.9
Shannon	642.4	533.2	466.5	72.6	58.9	7.8	24.5	3.8
Washington	487.8	376.7	375.2	76.9	1.5	--	31.4	6.4
Wayne	487.9	402.6	386.5	79.2	16.1	--	2.6	0.5
All counties	6,135.5	4,300.3	4,110.0	67.0	159.1	31.2	242.6	4.0

Table 2.--Area of timberland by county and ownership class, Eastern Ozarks Unit, Missouri, 1989

(In thousand acres)

County	All owners	Ownership class							
		National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. private corporation	Misc. private individual
Bollinger	215.5	1.6	--	--	--	--	127.6	13.5	72.8
Butler	130.7	47.4	--	3.1	--	--	15.7	7.8	56.7
Carter	266.4	90.2	--	20.6	--	13.2	13.3	9.6	119.5
Crawford	321.9	48.3	10.2	14.2	--	--	69.2	18.7	161.3
Dent	302.4	67.3	--	28.3	--	3.2	97.6	14.7	91.3
Iron	275.9	81.2	3.3	--	--	--	31.1	25.6	134.7
Madison	239.6	38.8	--	3.4	--	--	71.8	21.7	103.9
Oregon	292.6	71.0	--	--	--	8.9	89.4	45.2	78.1
Reynolds	425.5	85.5	14.9	38.9	--	62.6	70.8	23.8	129.0
Ripley	269.0	94.2	--	4.7	--	--	74.5	2.3	93.3
St. Francois	142.3	0.9	--	--	--	2.7	42.2	13.2	83.3
Shannon	466.5	83.4	2.4	59.2	--	69.6	61.3	20.4	170.2
Washington	375.2	78.1	3.5	9.9	--	10.7	133.2	51.4	88.4
Wayne	386.5	85.9	6.8	14.8	--	13.4	37.2	21.5	206.9
All counties	4,110.0	873.8	41.1	197.1	--	184.3	934.9	289.4	1,589.4

Table 3.--Area of timberland by county and forest type, Eastern Ozarks Unit, Missouri, 1989

(In thousand acres)

County	All types	Forest type											Non-stocked ¹
		Short-leaf pine	Eastern redcedar	Eastern redcedar-hardwood	Shortleaf pine - oak	Post-blackjack oak	Black-scarlet oak	White oak	Oak-gum-cypress	Elm-ash-soft maple	Cotton-wood	Maple-beech	
Bollinger	215.5	--	--	--	3.9	29.6	112.7	50.7	--	--	--	18.6	--
Butler	130.7	15.0	--	--	14.2	10.7	65.5	15.1	5.3	3.1	--	1.8	--
Carter	266.4	23.0	--	--	38.5	29.2	107.4	61.9	--	3.2	--	3.2	--
Crawford	321.9	--	1.6	1.6	4.1	81.3	100.8	113.9	--	13.0	--	5.6	--
Dent	302.4	8.2	--	--	33.9	74.7	130.7	52.9	--	--	--	2.0	--
Iron	275.9	4.4	5.0	2.2	9.4	4.2	125.1	116.7	--	--	--	8.9	--
Madison	239.6	10.6	--	7.4	15.2	17.9	101.8	73.0	--	3.4	--	8.4	1.9
Oregon	292.6	1.9	--	--	18.1	62.3	171.2	28.5	--	--	--	8.7	1.9
Reynolds	425.5	10.6	2.2	--	22.5	23.7	229.1	111.4	--	3.3	--	22.7	--
Ripley	269.0	15.2	--	--	5.7	59.3	118.8	43.8	4.4	13.9	--	7.9	--
St. Francois	142.3	--	5.4	12.5	--	25.8	50.2	40.7	--	5.0	--	2.7	--
Shannon	466.5	23.8	--	10.7	38.1	42.9	252.3	96.3	--	--	--	2.4	--
Washington	375.2	11.0	--	14.9	25.7	72.2	111.6	116.0	--	1.8	--	22.0	--
Wayne	386.5	9.4	4.0	1.7	20.0	32.4	221.9	80.8	--	1.7	--	14.6	--
All counties	4,110.0	133.1	18.2	51.0	249.3	566.2	1,899.1	1,001.7	9.7	48.4	--	129.5	3.8

¹ Nonstocked with all live trees.

Table 4.--Area of timberland by county and stand-size class,
Eastern Ozarks Unit, Missouri, 1989

(In thousand acres)

County	All stands	Stand-size class			
		Sawtimber	Poletimber	Seedling & sapling	Non-stocked ¹
Bollinger	215.5	110.7	53.0	51.8	--
Butler	130.7	74.4	42.0	14.3	--
Carter	266.4	112.2	76.4	77.8	--
Crawford	321.9	162.3	75.7	83.9	--
Dent	302.4	136.8	85.3	80.3	--
Iron	275.9	126.6	102.3	47.0	--
Madison	239.6	107.9	72.8	57.0	1.9
Oregon	292.6	132.3	51.7	106.7	1.9
Reynolds	425.5	238.4	97.1	90.0	--
Ripley	269.0	117.0	76.2	75.8	--
St. Francois	142.3	78.1	46.3	17.9	--
Shannon	466.5	213.9	113.1	139.5	--
Washington	375.2	183.1	122.0	70.1	--
Wayne	386.5	190.7	117.2	78.6	--
All counties	4,110.0	1,984.4	1,131.1	990.7	3.8

¹ Nonstocked with all live trees.

Table 5.--Area of timberland by county and site class,
Eastern Ozarks Unit, Missouri, 1989

(In thousand acres)

County	All classes	Site class (cubic feet of growth per acre per year)				
		165+	120-164	85-119	50-84	20-49
Bollinger	215.5	--	--	2.5	129.4	83.6
Butler	130.7	--	--	3.0	85.3	42.4
Carter	266.4	--	--	12.6	153.7	100.1
Crawford	321.9	--	--	7.2	122.9	191.8
Dent	302.4	--	--	--	142.8	159.6
Iron	275.9	--	--	--	165.2	110.7
Madison	239.6	--	--	3.4	108.3	127.9
Oregon	292.6	--	--	3.6	210.4	78.6
Reynolds	425.5	--	--	15.5	301.4	108.6
Ripley	269.0	--	3.4	9.3	146.9	109.4
St. Francois	142.3	--	--	--	44.9	97.4
Shannon	466.5	--	--	2.4	273.7	190.4
Washington	375.2	--	--	7.5	139.2	228.5
Wayne	386.5	--	--	8.5	243.0	135.0
All counties	4,110.0	--	3.4	75.5	2,267.1	1,764.0

Table 6.--Area of timberland by county and stocking class of growing-stock trees¹,
Eastern Ozarks Unit, Missouri, 1989

(In thousand acres)

County	All classes	Stocking percent of growing-stock trees				
		Non- stocked	Poorly stocked	Moderately stocked	Fully stocked	Over- stocked
Bollinger	215.5	--	68.0	111.5	34.0	2.0
Butler	130.7	--	36.4	66.3	19.8	8.2
Carter	266.4	--	41.7	161.0	49.0	14.7
Crawford	321.9	--	108.8	163.0	45.0	5.1
Dent	302.4	1.6	79.4	170.4	43.3	7.7
Iron	275.9	1.7	50.2	179.4	44.6	--
Madison	239.6	3.8	42.2	136.0	54.3	3.3
Oregon	292.6	3.8	85.2	142.7	48.3	12.6
Reynolds	425.5	3.9	98.1	195.4	114.6	13.5
Ripley	269.0	7.1	36.9	131.1	71.0	22.9
St. Francois	142.3	--	64.6	65.1	12.6	--
Shannon	466.5	--	74.1	262.3	122.8	7.3
Washington	375.2	--	105.8	185.7	76.0	7.7
Wayne	386.5	--	82.3	224.0	80.2	--
All counties	4,110.0	21.9	973.7	2,193.9	815.5	105.0

¹ This table is based on the stocking percent of growing-stock trees rather than that of all live trees, therefore, to use the definitions of stocking for this table, replace the term "all live" by "growing-stock".

Table 7.--Area of timberland by ownership class and stocking class of growing-stock trees¹,
Eastern Ozarks Unit, Missouri, 1989

(In thousand acres)

Ownership class	All classes	Stocking percent of growing-stock trees				
		Non- stocked	Poorly stocked	Moderately stocked	Fully stocked	Over- stocked
National forest	873.8	--	69.1	505.2	238.4	61.1
Miscellaneous federal	41.1	--	14.9	13.6	12.6	--
State	197.1	--	45.0	114.1	35.2	2.8
County and municipal	--	--	--	--	--	--
Forest Industry	184.3	--	52.4	95.0	36.9	--
Farmer	934.9	10.3	270.5	509.0	135.5	9.6
Miscellaneous private corporation	289.4	--	88.0	144.8	53.7	2.9
Miscellaneous private individual	1,589.4	11.6	433.8	812.2	303.2	28.6
All owners	4,110.0	21.9	973.7	2,193.9	815.5	105.0

¹ This table is based on the stocking percent of growing-stock trees rather than that of all live trees, therefore, to use the definitions of stocking for this table, replace the term "all live" by "growing-stock".

Table 8.--Area of timberland by forest type and ownership class, Eastern Ozarks Unit, Missouri, 1989

(In thousand acres)

Forest type	Ownership class								
	All owners	National forest	Misc. federal	State	County & municipal	Forest industry	Farmer	Misc. private corporation	Misc. private individual
Shortleaf pine	133.1	81.9	--	10.8	--	4.8	13.7	6.3	15.6
Eastern redcedar	18.2	--	1.6	--	--	--	4.9	4.0	7.7
E. redcedar-hardwood	51.0	2.3	3.5	--	--	--	26.4	5.7	13.1
Shortleaf pine-oak	249.3	97.0	--	10.9	--	14.5	36.4	5.6	84.9
Post-blackjack oak	566.2	54.3	--	12.4	--	32.4	167.4	29.0	270.7
Black-scarlet oak	1,899.1	402.6	11.7	115.5	--	104.5	357.5	139.6	767.7
White oak	1,001.7	224.1	11.8	42.0	--	28.1	245.3	77.2	373.2
Oak-gum-cypress	9.7	--	--	3.1	--	--	4.4	--	2.2
Elm-ash-soft maple	48.4	--	7.5	--	--	--	26.4	1.6	12.9
Cottonwood	--	--	--	--	--	--	--	--	--
Maple-beech	129.5	11.6	5.0	2.4	--	--	48.7	20.4	41.4
Nonstocked	3.8	--	--	--	--	--	3.8	--	--
All types	4,110.0	873.8	41.1	197.1	--	184.3	934.9	289.4	1,589.4

Table 9.--Area of timberland by forest type and stand-size class,
Eastern Ozarks Unit, Missouri, 1989

(In thousand acres)

Forest type	All stands	Stand-size class			
		Sawtimber	Poletimber	Seedling & sapling	Non-stocked ¹
Shortleaf pine	133.1	93.2	30.7	9.2	--
Eastern redcedar	18.2	11.2	--	7.0	--
E. redcedar-hardwood	51.0	12.0	20.3	18.7	--
Shortleaf pine-oak	249.3	142.1	74.4	32.8	--
Post-blackjack oak	566.2	215.5	175.4	175.3	--
Black-scarlet oak	1,899.1	946.1	508.5	444.5	--
White oak	1,001.7	498.1	277.6	226.0	--
Oak-gum-cypress	9.7	3.1	6.6	--	--
Elm-ash-soft maple	48.4	38.1	3.3	7.0	--
Cottonwood	--	--	--	--	--
Maple-beech	129.5	25.0	34.3	70.2	--
Nonstocked	3.8	--	--	--	3.8
All types	4,110.0	1,984.4	1,131.1	990.7	3.8

¹ Nonstocked with all live trees.

Table 10.--Number of all live trees on timberland by species group and diameter class, Eastern Ozarks Unit, Missouri, 1989

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height)											
		1.0- 2.9	3.0- 4.9	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0+
Softwoods													
Shortleaf pine	99,123	22,044	21,905	20,275	14,093	10,190	6,337	2,908	980	279	90	21	1
Other yellow pines	393	75	75	--	139	104	--	--	--	--	--	--	--
Baldcypress	183	120	--	36	27	--	--	--	--	--	--	--	--
Eastern redcedar	42,269	24,355	10,850	4,092	1,655	741	443	46	52	26	--	9	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	141,968	46,594	32,830	24,403	15,914	11,035	6,780	2,954	1,032	305	90	30	1
Hardwoods													
Select white oak	387,913	153,705	101,825	52,823	29,974	20,830	12,506	8,229	4,195	2,187	766	818	55
Other white oak	179,992	75,319	45,816	23,263	14,829	9,115	5,582	3,286	1,597	674	248	246	17
Select red oak	18,008	4,296	5,262	1,926	1,689	1,584	1,321	766	559	277	143	165	20
Other red oak	390,697	131,568	86,246	58,051	37,335	30,604	20,533	13,785	7,280	2,820	1,399	1,008	68
Select hickory	106,754	65,549	20,462	9,261	4,867	3,149	2,007	993	351	79	9	25	2
Other hickory	261,121	167,453	54,680	17,986	9,593	5,515	3,412	1,612	585	200	76	9	--
Basswood	1,418	1,326	75	--	17	--	--	--	--	--	--	--	--
Beech	132	132	--	--	--	--	--	--	--	--	--	--	--
Hard maple	39,474	26,747	7,349	2,507	1,153	784	328	371	117	47	30	37	4
Soft maple	65,254	54,349	8,370	1,549	353	315	92	50	84	32	25	32	3
Elm	87,132	65,027	12,595	6,374	1,343	928	550	224	54	20	--	17	--
Ash	23,737	16,014	3,948	1,435	1,074	479	437	176	88	53	17	16	--
Sycamore	6,968	2,598	1,244	879	574	436	500	293	173	131	62	67	11
Cottonwood	32	--	--	--	--	--	--	--	--	11	3	18	--
Willow	580	246	66	190	--	--	--	28	--	24	11	15	--
Hackberry	6,772	4,263	998	739	203	194	172	83	89	28	--	3	--
Aspen	--	--	--	--	--	--	--	--	--	--	--	--	--
Birch	1,618	366	300	418	98	201	46	71	61	24	15	18	--
Sweetgum	2,456	1,347	198	401	152	266	54	--	25	8	5	--	--
Tupelo	91,819	73,011	13,386	2,921	863	624	370	270	135	80	77	82	--
Black cherry	17,189	11,940	3,737	904	315	174	62	22	16	12	5	2	--
Black walnut	9,788	3,688	1,746	942	1,607	952	499	191	102	32	17	12	--
Butternut	244	54	--	90	--	48	52	--	--	--	--	--	--
Yellow-poplar	510	408	--	--	53	16	27	6	--	--	--	--	--
Persimmon	23,173	17,717	4,057	1,174	140	73	--	12	--	--	--	--	--
Sassafras	80,271	70,006	8,416	1,259	491	43	32	11	--	13	--	--	--
Other hardwoods	275,805	230,266	37,973	5,710	759	391	194	302	98	78	15	19	--
Noncommercial sp.	52,089	42,594	7,811	1,491	184	--	--	--	9	--	--	--	--
Total	2,130,946	1,219,989	426,560	192,293	107,666	76,721	48,776	30,781	15,618	6,830	2,923	2,609	180
All species	2,272,914	1,266,583	459,390	216,696	123,580	87,756	55,556	33,735	16,650	7,135	3,013	2,639	181

Table 11.--Number of growing-stock trees on timberland by species group and diameter class, Eastern Ozarks Unit, Missouri, 1989

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height)											
		1.0- 2.9	3.0- 4.9	5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0+
Softwoods													
Shortleaf pine	95,025	22,044	20,371	19,026	13,302	10,053	6,126	2,761	968	268	90	15	1
Other yellow pines	378	75	75	--	139	89	--	--	--	--	--	--	--
Baldcypress	183	120	--	36	27	--	--	--	--	--	--	--	--
Eastern redcedar	39,980	24,155	10,169	3,470	1,304	460	338	31	27	23	--	3	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	135,566	46,394	30,615	22,532	14,772	10,602	6,464	2,792	995	291	90	18	1
Hardwoods													
Select white oak	335,312	142,130	87,404	45,810	24,339	16,207	8,818	5,743	2,848	1,382	379	242	10
Other white oak	141,497	66,581	36,104	16,832	11,199	5,695	2,679	1,574	611	179	43	--	--
Select red oak	14,062	3,726	4,206	1,640	1,350	1,255	843	465	284	143	69	78	3
Other red oak	319,045	129,259	66,688	42,802	27,856	21,734	14,312	9,166	4,542	1,679	665	328	14
Select hickory	87,142	55,624	16,629	7,242	3,566	2,076	1,142	571	238	37	--	17	--
Other hickory	224,741	151,490	44,442	13,984	7,151	3,888	2,260	1,000	382	100	41	3	--
Basswood	1,326	1,326	--	--	--	--	--	--	--	--	--	--	--
Beech	75	75	--	--	--	--	--	--	--	--	--	--	--
Hard maple	34,819	26,087	5,858	1,364	737	426	141	180	17	--	9	--	--
Soft maple	55,382	48,593	6,273	241	37	95	24	31	39	6	20	20	3
Elm	78,271	62,917	10,468	3,645	620	349	150	97	15	8	--	2	--
Ash	19,099	14,715	2,711	769	387	220	169	46	43	23	11	5	--
Sycamore	5,534	2,598	730	741	233	364	297	232	126	113	43	54	3
Cottonwood	27	--	--	--	--	--	--	--	--	11	3	13	--
Willow	308	246	--	--	--	--	--	21	--	24	11	6	--
Hackberry	5,140	4,263	162	217	179	180	44	45	19	28	--	3	--
Aspen	--	--	--	--	--	--	--	--	--	--	--	--	--
Birch	1,277	366	234	359	42	126	28	64	44	6	5	3	--
Sweetgum	2,274	1,347	198	324	72	266	36	--	18	8	5	--	--
Tupelo	88,528	73,011	12,063	2,258	465	351	162	132	46	15	8	17	--
Black cherry	14,449	11,940	1,971	352	39	93	31	15	8	--	--	--	--
Black walnut	6,402	3,498	975	452	570	556	210	100	21	12	8	--	--
Butternut	127	54	--	38	--	21	14	--	--	--	--	--	--
Yellow-poplar	424	408	--	--	--	--	16	--	--	--	--	--	--
Persimmon	20,168	16,326	3,318	478	46	--	--	--	--	--	--	--	--
Sassafras	72,308	67,399	4,233	488	176	12	--	--	--	--	--	--	--
Other hardwoods	242,071	219,914	19,374	2,221	196	147	49	111	23	26	5	5	--
Total	1,769,808	1,103,893	324,041	142,257	79,260	54,061	31,425	19,593	9,324	3,800	1,325	796	33
All species	1,905,374	1,150,287	354,656	164,789	94,032	64,663	37,889	22,385	10,319	4,091	1,415	814	34

Table 12.--Net volume of timber on timberland by class of timber and species group,
Eastern Ozarks Unit, Missouri, 1989

(In thousand cubic feet)

Class of timber	All species	Species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
Live trees					
Growing-stock trees					
Sawtimber					
Saw-log portion	1,473,905	266,056	8,187	55,594	1,144,068
Upper stem portion	300,693	35,890	1,274	8,927	254,602
Total	1,774,598	301,946	9,461	64,521	1,398,670
Poletimber	1,313,677	112,576	13,025	40,391	1,147,685
All growing-stock trees	3,088,275	414,522	22,486	104,912	2,546,355
Cull trees					
Short-log trees	155,243	2,459	137	4,766	147,881
Rough trees					
Sawtimber	450,122	3,613	3,905	22,650	419,954
Poletimber	318,328	3,812	2,161	25,146	287,209
Total	768,450	7,425	6,066	47,796	707,163
Rotten trees					
Sawtimber	184,931	838	75	11,846	172,172
Poletimber	42,390	1,020	219	3,011	38,140
Total	227,321	1,858	294	14,857	210,312
All cull trees	1,151,014	11,742	6,497	67,419	1,065,356
All live trees	4,239,289	426,264	28,983	172,331	3,611,711
Salvable dead trees					
Sawtimber	18,307	1,278	--	562	16,467
Poletimber	10,525	1,287	--	162	9,076
Total	28,832	2,565	--	724	25,543
All classes of timber	4,268,121	428,829	28,983	173,055	3,637,254

Table 13.--Net volume of growing-stock trees on timberland by species group and diameter class, Eastern Ozarks Unit, Missouri, 1989

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height)									
		5.0- 6.9	7.0- 8.9	9.0- 10.9	11.0- 12.9	13.0- 14.9	15.0- 16.9	17.0- 18.9	19.0- 20.9	21.0- 28.9	29.0+
Softwoods											
Shortleaf pine	412,941	43,514	68,337	93,541	93,838	63,197	31,537	12,332	5,384	1,043	218
Other yellow pines	1,581	--	725	856	--	--	--	--	--	--	--
Baldcypress	117	54	63	--	--	--	--	--	--	--	--
Eastern redcedar	22,369	7,007	5,901	3,451	3,917	576	640	718	--	159	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--
Total	437,008	50,575	75,026	97,848	97,755	63,773	32,177	13,050	5,384	1,202	218
Hardwoods											
Select white oak	799,783	102,995	120,074	144,499	127,839	123,101	86,691	55,219	19,837	17,851	1,677
Other white oak	229,261	36,274	51,015	48,412	36,089	31,776	16,864	6,758	2,073	--	--
Select red oak	71,431	4,200	7,835	11,591	12,803	9,896	8,751	5,989	3,753	6,207	406
Other red oak	1,098,469	96,150	138,404	193,138	207,323	197,652	136,789	67,128	35,423	23,841	2,621
Select hickory	96,767	15,935	18,060	19,963	17,878	13,942	8,158	1,703	--	1,128	--
Other hickory	183,425	29,801	35,867	37,399	36,051	23,907	13,079	4,631	2,322	368	--
Basswood	--	--	--	--	--	--	--	--	--	--	--
Beech	--	--	--	--	--	--	--	--	--	--	--
Hard maple	19,375	3,129	3,927	4,269	2,337	4,615	563	--	535	--	--
Soft maple	8,105	543	159	814	369	746	1,295	271	1,196	2,066	646
Elm	17,875	7,400	2,972	2,769	1,961	1,894	456	283	--	140	--
Ash	12,664	1,874	1,819	1,984	2,592	1,021	1,318	1,027	674	355	--
Sycamore	39,952	1,940	1,515	4,451	5,442	5,986	5,113	5,903	3,001	5,362	1,239
Cottonwood	1,968	--	--	--	--	--	--	614	181	1,173	--
Willow	3,329	--	--	--	--	655	--	1,369	688	617	--
Hackberry	6,536	380	720	1,596	739	1,108	551	1,097	--	345	--
Aspen	--	--	--	--	--	--	--	--	--	--	--
Birch	6,274	809	222	1,171	394	1,494	1,290	334	351	209	--
Sweetgum	5,294	624	350	2,692	488	--	570	354	216	--	--
Tupelo	18,445	4,435	2,084	2,989	2,218	2,860	1,504	639	449	1,267	--
Black cherry	2,737	746	186	781	399	394	231	--	--	--	--
Black walnut	15,111	1,179	2,894	4,577	2,917	2,005	623	489	427	--	--
Butternut	387	98	--	147	142	--	--	--	--	--	--
Yellow-poplar	284	--	--	--	284	--	--	--	--	--	--
Persimmon	1,048	862	186	--	--	--	--	--	--	--	--
Sassafras	1,672	757	793	122	--	--	--	--	--	--	--
Other hardwoods	11,075	3,395	985	1,119	667	2,403	797	1,117	283	309	--
Total	2,651,267	313,526	390,067	484,483	458,932	425,455	284,643	154,925	71,409	61,238	6,589
All species	3,088,275	364,101	465,093	582,331	556,687	489,228	316,820	167,975	76,793	62,440	6,807

Table 14.--Net volume of growing stock in the saw-log portion of sawtimber trees on timberland by species group and diameter class, Eastern Ozarks Unit, Missouri, 1989

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Shortleaf pine	265,353	75,825	83,066	58,307	29,835	11,863	5,225	1,017	215
Other yellow pines	703	703	--	--	--	--	--	--	--
Baldcypress	--	--	--	--	--	--	--	--	--
Eastern redcedar	8,187	2,784	3,430	533	600	685	--	155	--
Other softwoods	--	--	--	--	--	--	--	--	--
Total	274,243	79,312	86,496	58,840	30,435	12,548	5,225	1,172	215
Hardwoods									
Select white oak	356,154	--	93,327	100,635	75,532	49,784	18,353	16,891	1,632
Other white oak	73,128	--	25,323	25,432	14,436	6,037	1,900	--	--
Select red oak	40,835	--	9,676	8,179	7,705	5,455	3,500	5,926	394
Other red oak	551,593	--	151,656	162,062	119,226	60,677	32,826	22,576	2,570
Select hickory	33,704	--	12,687	11,348	7,076	1,538	--	1,055	--
Other hickory	63,422	--	25,935	19,426	11,373	4,186	2,146	356	--
Basswood	--	--	--	--	--	--	--	--	--
Beech	--	--	--	--	--	--	--	--	--
Hard maple	6,547	--	1,727	3,837	488	--	495	--	--
Soft maple	5,973	--	265	614	1,129	244	1,111	1,977	633
Elm	3,616	--	1,346	1,492	393	251	--	134	--
Ash	5,741	--	1,880	830	1,139	931	625	336	--
Sycamore	28,274	--	4,156	4,974	4,567	5,410	2,815	5,128	1,224
Cottonwood	1,866	--	--	--	--	572	170	1,124	--
Willow	3,008	--	--	547	--	1,243	630	588	--
Hackberry	3,262	--	557	922	472	980	--	331	--
Aspen	--	--	--	--	--	--	--	--	--
Birch	3,387	--	271	1,203	1,087	305	327	194	--
Sweetgum	1,322	--	325	--	486	316	195	--	--
Tupelo	7,196	--	1,476	2,258	1,291	568	411	1,192	--
Black cherry	783	--	259	328	196	--	--	--	--
Black walnut	4,977	--	2,026	1,587	535	437	392	--	--
Butternut	78	--	78	--	--	--	--	--	--
Yellow-poplar	216	--	216	--	--	--	--	--	--
Persimmon	--	--	--	--	--	--	--	--	--
Sassafras	--	--	--	--	--	--	--	--	--
Other hardwoods	4,580	--	443	1,901	691	996	262	287	--
Total	1,199,662	--	333,629	347,575	247,822	139,930	66,158	58,095	6,453
All species	1,473,905	79,312	420,125	406,415	278,257	152,478	71,383	59,267	6,668

Table 15.--Net volume of sawtimber trees on timberland by species group and diameter class, Eastern Ozarks Unit, Missouri, 1989

(In thousand board feet)¹

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Shortleaf pine	1,551,215	467,182	481,798	331,456	167,978	66,581	29,381	5,657	1,182
Other yellow pines	4,219	4,219	--	--	--	--	--	--	--
Baldcypress	--	--	--	--	--	--	--	--	--
Eastern redcedar	49,104	19,125	20,376	2,774	2,982	3,178	--	669	--
Other softwoods	--	--	--	--	--	--	--	--	--
Total	1,604,538	490,526	502,174	334,230	170,960	69,759	29,381	6,326	1,182
Hardwoods									
Select white oak	2,065,696	--	627,373	594,719	411,193	257,144	90,464	78,284	6,519
Other white oak	463,499	--	179,465	157,415	83,255	33,276	10,088	--	--
Select red oak	236,655	--	63,345	49,392	43,749	29,858	18,591	29,864	1,856
Other red oak	3,316,332	--	1,027,555	982,285	678,974	330,834	172,899	113,598	10,187
Select hickory	207,244	--	86,422	67,533	39,546	8,254	--	5,489	--
Other hickory	399,036	--	178,757	118,856	65,030	23,079	11,519	1,795	--
Basswood	--	--	--	--	--	--	--	--	--
Beech	--	--	--	--	--	--	--	--	--
Hard maple	38,522	--	11,184	22,118	2,691	--	2,529	--	--
Soft maple	28,195	--	1,596	3,256	5,689	1,187	5,219	8,784	2,464
Elm	21,611	--	9,110	8,711	2,025	1,212	--	553	--
Ash	32,467	--	11,754	4,730	6,192	4,885	3,215	1,691	--
Sycamore	148,340	--	24,407	27,089	24,107	28,006	14,531	25,535	4,665
Cottonwood	10,069	--	--	--	--	3,143	894	6,032	--
Willow	15,216	--	--	3,085	--	6,325	3,158	2,648	--
Hackberry	16,884	--	3,426	5,053	2,431	4,745	--	1,229	--
Aspen	--	--	--	--	--	--	--	--	--
Birch	18,513	--	1,820	6,838	5,887	1,490	1,546	932	--
Sweetgum	7,482	--	2,258	--	2,616	1,619	989	--	--
Tupelo	40,787	--	10,276	13,187	6,846	2,910	2,020	5,548	--
Black cherry	4,708	--	1,845	1,804	1,059	--	--	--	--
Black walnut	30,942	--	13,958	9,674	2,979	2,327	2,004	--	--
Butternut	673	--	673	--	--	--	--	--	--
Yellow-poplar	1,387	--	1,387	--	--	--	--	--	--
Persimmon	--	--	--	--	--	--	--	--	--
Sassafras	--	--	--	--	--	--	--	--	--
Other hardwoods	25,625	--	3,131	11,112	3,627	5,105	1,258	1,392	--
Total	7,129,883	--	2,259,742	2,086,857	1,387,896	745,399	340,924	283,374	25,691
All species	8,734,421	490,526	2,761,916	2,421,087	1,558,856	815,158	370,305	289,700	26,873

¹ International 1/4-inch rule.

Table 16.--Net volume of growing stock and sawtimber on timberland by county and species group, Eastern Ozarks Unit, Missouri, 1989

County	Growing stock					Sawtimber				
	All species	Species group				All species	Species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	----- Thousand cubic feet -----					----- Thousand board feet ¹ -----				
Bollinger	158,538	5,072	--	6,837	146,629	439,787	14,573	--	15,356	409,858
Butler	116,203	24,656	--	4,879	86,668	351,975	90,714	--	13,916	247,345
Carter	195,855	53,255	138	5,209	137,253	544,027	178,513	--	19,980	345,534
Crawford	215,261	813	1,165	16,024	197,259	607,439	--	3,168	58,096	546,175
Dent	196,419	25,837	259	3,531	166,792	522,840	83,209	--	8,977	430,654
Iron	231,430	18,881	2,074	2,919	207,556	593,160	78,029	6,399	5,255	503,477
Madison	184,533	23,174	2,489	15,202	143,668	515,444	81,641	7,216	53,090	373,497
Oregon	190,348	20,574	539	4,952	164,283	566,936	78,284	1,959	14,003	472,690
Reynolds	348,910	56,890	1,193	5,689	285,138	1,029,240	224,572	3,713	6,567	794,388
Ripley	214,681	38,476	373	18,352	157,480	667,127	178,044	--	46,767	442,316
St. Francois	98,435	39	4,308	2,920	91,168	297,506	--	6,258	7,153	284,095
Shannon	356,707	64,094	841	3,537	288,235	1,001,356	240,349	1,959	7,523	751,525
Washington	273,757	41,549	6,285	8,276	217,647	725,336	157,047	9,684	24,405	534,200
Wayne	307,198	41,212	2,822	6,585	256,579	872,248	150,459	8,748	14,264	698,777
All counties	3,088,275	414,522	22,486	104,912	2,546,355	8,734,421	1,555,434	49,104	295,352	6,834,531

¹International 1/4-inch rule.

Table 17.--Net volume of live trees and growing stock on timberland by ownership class and species group. Eastern Ozarks Unit, Missouri, 1989

(In thousand cubic feet)

Ownership class	Live trees					Growing stock				
	All species	Species group				All species	Species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
National forest	1,004,392	197,264	1,041	25,272	780,815	806,656	193,979	922	16,055	595,700
Miscellaneous federal	58,795	4,001	1,521	9,971	43,302	43,950	3,691	940	7,174	32,145
State	198,634	21,697	680	4,056	172,201	145,133	21,134	605	2,312	121,082
County and municipal	--	--	--	--	--	--	--	--	--	--
Forest industry	186,493	22,083	--	940	163,470	135,758	21,891	--	705	113,162
Farmer	907,866	49,692	8,211	61,407	788,556	630,908	49,023	5,779	39,791	536,315
Miscellaneous private corporation	286,523	19,191	5,837	10,306	251,189	199,863	18,532	5,198	5,909	170,224
Miscellaneous private individual	1,596,586	112,336	11,693	60,379	1,412,178	1,126,007	106,272	9,042	32,966	977,727
All owners	4,239,289	426,264	28,983	172,331	3,611,711	3,088,275	414,522	22,486	104,912	2,546,355

Table 18.--Net volume of sawtimber trees on timberland by species group and butt log grade,
Eastern Ozarks Unit, Missouri, 1989

(In thousand board feet) ¹

Species group	All	Butt log grade			Tie and timber
	grades	1	2	3	
Softwoods					
Shortleaf pine	1,551,215	35,092	330,325	1,185,798	--
Other yellow pines	4,219	--	--	4,219	--
Baldcypress	--	--	--	--	--
Eastern redcedar	49,104	--	3,879	45,225 ²	--
Other softwoods	--	--	--	--	--
Total	1,604,538	35,092	334,204	1,235,242	--
Hardwoods					
Select white oak	2,065,696	50,630	232,974	838,321	943,771
Other white oak	463,499	--	12,825	158,515	292,159
Select red oak	236,655	3,240	21,425	54,809	157,181
Other red oak	3,316,332	8,935	140,462	716,327	2,450,608
Select hickory	207,244	--	9,224	65,464	132,556
Other hickory	399,036	--	39,370	163,742	195,924
Basswood	--	--	--	--	--
Beech	--	--	--	--	--
Hard maple	38,522	--	--	6,355	32,167
Soft maple	28,195	--	--	28,195	--
Elm	21,611	--	4,220	2,125	15,266
Ash	32,467	--	13,330	19,137	--
Sycamore	148,340	46,515	34,648	45,517	21,660
Cottonwood	10,069	--	4,134	5,935	--
Willow	15,216	--	--	15,216	--
Hackberry	16,884	--	3,297	1,661	11,926
Aspen	--	--	--	--	--
Birch	18,513	--	4,919	4,394	9,200
Sweetgum	7,482	--	--	5,280	2,202
Tupelo	40,787	1,583	--	22,378	16,826
Black cherry	4,708	--	--	--	4,708
Black walnut	30,942	--	7,795	15,199	7,948
Butternut	673	--	170	331	172
Yellow-poplar	1,387	--	349	681	357
Persimmon	--	--	--	--	--
Sassafras	--	--	--	--	--
Other hardwoods	25,625	--	--	14,089	11,536
Total	7,129,883	110,903	529,142	2,183,671	4,306,167
All species	8,734,421	145,995	863,346	3,418,913	4,306,167

¹International 1/4-inch rule.

²Includes 3,572 thousand board feet of volume from sawtimber-sized, Grade 5 eastern redcedar trees graded for special use. (See Log Grades for Eastern Redcedar in the Appendix.)

Table 19.--Net annual growth of growing stock and sawtimber on timberland by county and species group, Eastern Ozarks Unit, Missouri, 1988

County	Growing stock					Sawtimber				
	All species	Species group				All species	Species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	----- <i>Thousand cubic feet</i> -----					----- <i>Thousand board feet</i> ¹ -----				
Bollinger	5,329	183	--	98	5,048	17,470	879	--	403	16,188
Butler	2,864	512	--	190	2,162	12,184	2,566	--	680	8,938
Carter	6,114	2,162	--	87	3,865	19,433	8,222	--	655	10,556
Crawford	5,397	108	68	255	4,966	19,201	344	237	1,074	17,546
Dent	6,006	960	13	111	4,922	17,757	3,867	--	123	13,767
Iron	6,541	414	53	60	6,014	24,080	2,852	116	-111	21,223
Madison	5,426	665	165	295	4,301	18,979	4,155	225	1,023	13,576
Oregon	6,044	491	16	62	5,475	22,102	2,129	50	745	19,178
Reynolds	9,944	1,378	14	125	8,427	36,885	8,196	15	105	28,569
Ripley	5,391	651	7	494	4,239	21,854	3,573	--	2,230	16,051
St. Francois	2,266	2	244	69	1,951	7,830	--	250	69	7,511
Shannon	11,245	2,055	38	131	9,021	37,732	9,082	43	141	28,466
Washington	8,053	1,013	296	70	6,674	27,021	4,681	471	353	21,516
Wayne	8,288	1,101	51	124	7,012	31,854	4,896	163	-15	26,810
All counties	88,908	11,695	965	2,171	74,077	314,382	55,442	1,570	7,475	249,895

¹ International 1/4-inch rule.

Table 20.--Average annual timber removals of growing stock and sawtimber on timberland by county and species group.
Eastern Ozarks Unit, Missouri, 1988

County	Growing stock					Sawtimber				
	All species	Species group				All species	Species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	----- Thousand cubic feet -----					----- Thousand board feet ¹ -----				
Bollinger	1,969	46	--	41	1,882	7,440	238	--	178	7,024
Butler	2,348	379	--	185	1,784	6,656	903	--	519	5,234
Carter	2,351	107	--	72	2,172	7,507	252	--	173	7,082
Crawford	1,243	--	--	--	1,243	4,515	--	--	--	4,515
Dent	2,548	--	--	25	2,523	6,357	--	--	--	6,357
Iron	2,529	45	--	76	2,408	5,402	238	--	299	4,865
Madison	2,259	221	--	--	2,038	6,691	1,138	--	--	5,553
Oregon	4,985	562	--	113	4,310	16,668	2,680	--	173	13,815
Reynolds	4,931	387	--	138	4,406	18,516	1,819	--	517	16,180
Ripley	2,106	70	--	96	1,940	6,933	359	--	310	6,264
St. Francois	287	--	--	--	287	1,410	--	--	--	1,410
Shannon	2,990	660	20	195	2,115	10,281	2,138	--	839	7,304
Washington	2,701	390	--	91	2,220	6,313	1,562	--	230	4,521
Wayne	4,160	--	--	27	4,133	14,604	--	--	--	14,604
All counties	37,407	2,867	20	1,059	33,461	119,293	11,327	--	3,238	104,728

¹International 1/4-inch rule.

Table 21.--Net annual growth and average annual removals of growing stock and sawtimber on timberland by species group, Eastern Ozarks Unit, Missouri, 1988

Species group	Growing stock		Sawtimber	
	Growth	Removals	Growth	Removals
	<i>Thousand cubic feet</i>		<i>Thousand board feet</i> ¹	
Softwoods				
Shortleaf pine	11,653	2,867	55,108	11,327
Other yellow pines	42	--	334	--
Baldcypress	8	--	--	--
Eastern redcedar	957	20	1,570	--
Other softwoods	--	--	--	--
Total	12,660	2,887	57,012	11,327
Hardwoods				
Select white oak	26,611	6,951	80,710	20,073
Other white oak	4,596	2,958	12,716	8,703
Select red oak	1,941	1,137	6,191	4,177
Other red oak	32,582	19,500	131,051	64,657
Select hickory	1,937	968	4,637	2,704
Other hickory	4,091	1,254	11,351	2,677
Basswood	--	--	--	--
Beech	--	--	--	--
Hard maple	683	--	1,038	--
Soft maple	269	25	655	--
Elm	19	360	-385	953
Ash	361	292	790	627
Sycamore	869	244	4,330	970
Cottonwood	50	--	265	--
Willow	62	--	327	--
Hackberry	340	--	1,053	--
Aspen	--	--	--	--
Birch	74	--	-11	--
Sweetgum	284	78	851	141
Tupelo	183	279	211	944
Black cherry	90	73	133	230
Black walnut	366	213	699	613
Butternut	5	--	35	--
Yellow-poplar	--	--	--	--
Persimmon	95	22	--	--
Sassafras	128	34	--	--
Other hardwoods	612	132	723	497
Total	76,248	34,520	257,370	107,966
All species	88,908	37,407	314,382	119,293

¹International 1/4-inch rule.

Table 22.--Net annual growth and average annual removals of growing stock on timberland by ownership class and species group,
Eastern Ozarks Unit, Missouri, 1988

(In thousand cubic feet)

Ownership class	Growth					Removals				
	All species	Species group				All species	Species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
National forest	21,139	4,401	81	307	16,350	9,757	1,855	20	153	7,729
Miscellaneous federal	690	68	30	100	492	673	--	--	72	601
State	3,740	651	9	104	2,976	861	28	--	118	715
County and municipal	--	--	--	--	--	--	--	--	--	--
Forest industry	4,275	637	--	33	3,605	1,732	116	--	59	1,557
Farmer	18,862	1,738	368	1,004	15,752	10,724	380	--	394	9,950
Miscellaneous private corporation	6,293	595	120	143	5,435	1,675	--	--	--	1,675
Miscellaneous private individual	33,909	3,605	357	480	29,467	11,985	488	--	263	11,234
All owners	88,908	11,695	965	2,171	74,077	37,407	2,867	20	1,059	33,461

Table 23.--Net annual growth and average annual removals of sawtimber on timberland by ownership class and species group,
Eastern Ozarks Unit, Missouri, 1988

(In thousand board feet)¹

Ownership class	Growth					Removals				
	All species	Species group				All species	Species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
National forest	81,499	21,438	234	1,246	58,581	27,028	6,705	--	256	20,067
Miscellaneous federal	2,383	288	42	333	1,720	1,416	--	--	173	1,243
State	13,768	3,108	28	127	10,505	3,418	--	--	557	2,861
County and municipal	--	--	--	--	--	--	--	--	--	--
Forest industry	16,753	4,213	--	99	12,441	7,829	613	--	273	6,943
Farmer	64,007	7,534	456	3,561	52,456	33,060	1,601	--	1,230	30,229
Miscellaneous private corporation	20,631	2,644	430	114	17,443	6,305	--	--	--	6,305
Miscellaneous private individual	115,341	16,217	380	1,995	96,749	40,237	2,408	--	749	37,080
All owners	314,382	55,442	1,570	7,475	249,895	119,293	11,327	--	3,238	104,728

¹International 1/4-inch rule.

Table 24.--Annual mortality of growing stock and sawtimber on timberland by species group, Eastern Ozarks Unit, Missouri, 1988

Species group	Growing stock	Sawtimber
	Thousand cubic feet	Thousand board feet ¹
Softwoods		
Shortleaf pine	1,483	3,870
Other yellow pines	7	12
Baldcypress	2	--
Eastern redcedar	105	329
Other softwoods	--	--
Total	1,597	4,211
Hardwoods		
Select white oak	1,539	3,480
Other white oak	1,310	2,496
Select red oak	421	1,372
Other red oak	11,566	26,945
Select hickory	624	1,075
Other hickory	1,321	2,155
Basswood	--	--
Beech	--	--
Hard maple	125	208
Soft maple	55	170
Elm	699	990
Ash	92	216
Sycamore	330	843
Cottonwood	2	11
Willow	20	94
Hackberry	60	13
Aspen	--	--
Birch	98	258
Sweetgum	50	47
Tupelo	108	206
Black cherry	36	23
Black walnut	164	327
Butternut	2	--
Yellow-poplar	--	--
Persimmon	39	--
Sassafras	10	--
Other hardwoods	52	126
Total	18,723	41,055
All species	20,320	45,266

¹International 1/4-inch rule.

Table 25.--Area of nonforest land with trees by county and land use class, Eastern Ozarks Unit, Missouri, 1989

(In thousand acres)

County	All classes	Land use class							Wooded pasture
		Cropland with trees	Improved pasture with trees	Wooded strips	Idle farmland with trees	Marsh with trees	Urban and other with trees	Windbreaks	
Bollinger	6.2	--	4.2	--	--	2.0	--	--	--
Butler	19.2	--	4.3	--	--	--	3.0	--	11.9
Carter	6.4	--	3.2	--	--	--	3.2	--	--
Crawford	25.7	--	9.2	10.1	--	--	3.2	--	3.2
Dent	24.6	--	15.0	--	--	--	6.4	--	3.2
Iron	19.6	--	9.4	--	--	--	10.2	--	--
Madison	2.6	--	2.6	--	--	--	--	--	--
Oregon	32.6	--	29.4	1.6	--	--	1.6	--	--
Reynolds	18.0	--	8.9	--	2.2	--	4.4	--	2.5
Ripley	20.8	--	10.1	7.3	--	--	--	--	3.4
St. Francois	8.4	--	3.4	--	1.7	--	1.6	--	1.7
Shannon	24.5	--	13.6	--	--	--	5.5	--	5.4
Washington	31.4	--	9.2	--	--	--	13.9	--	8.3
Wayne	2.6	--	2.6	--	--	--	--	--	--
All counties	242.6	--	125.1	19.0	3.9	2.0	53.0	--	39.6

Table 26.--Net volume of short-log trees on timberland by species group and diameter class, Eastern Ozarks Unit, Missouri, 1989

(In thousand cubic feet)

		Diameter class (inches at breast height)							
Species group	All classes	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Shortleaf pine	2,459	--	788	1,671	--	--	--	--	--
Other yellow pines	--	--	--	--	--	--	--	--	--
Baldcypress	--	--	--	--	--	--	--	--	--
Eastern redcedar	137	137	--	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
Total	2,596	137	788	1,671	--	--	--	--	--
Hardwoods									
Select white oak	59,181	--	12,357	14,831	13,029	9,064	5,422	4,184	294
Other white oak	19,939	--	7,167	6,754	3,417	1,648	362	369	222
Select red oak	6,316	--	1,245	1,060	1,920	939	360	580	212
Other red oak	42,328	--	8,814	8,452	10,342	5,879	4,300	4,209	332
Select hickory	6,053	--	2,253	2,963	541	--	--	296	--
Other hickory	6,164	--	1,354	3,232	1,325	253	--	--	--
Basswood	--	--	--	--	--	--	--	--	--
Beech	--	--	--	--	--	--	--	--	--
Hard maple	2,207	--	473	1,044	--	690	--	--	--
Soft maple	1,198	--	--	--	--	336	251	611	--
Elm	1,250	--	298	391	--	225	--	336	--
Ash	2,380	--	956	765	205	208	246	--	--
Sycamore	1,006	--	--	494	240	--	--	272	--
Cottonwood	--	--	--	--	--	--	--	--	--
Willow	--	--	--	--	--	--	--	--	--
Hackberry	144	--	--	--	144	--	--	--	--
Aspen	--	--	--	--	--	--	--	--	--
Birch	240	--	--	--	--	--	--	240	--
Sweetgum	--	--	--	--	--	--	--	--	--
Tupelo	1,168	--	186	233	155	310	--	284	--
Black cherry	--	--	--	--	--	--	--	--	--
Black walnut	1,379	--	461	146	394	378	--	--	--
Butternut	--	--	--	--	--	--	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--
Persimmon	--	--	--	--	--	--	--	--	--
Sassafras	--	--	--	--	--	--	--	--	--
Other hardwoods	1,694	--	--	234	297	757	406	--	--
Total	152,647	--	35,564	40,599	32,009	20,687	11,347	11,381	1,060
All species	155,243	137	36,352	42,270	32,009	20,687	11,347	11,381	1,060

Table 27.--Net volume of short-log trees on timberland by species group and diameter class, Eastern Ozarks Unit, Missouri, 1989

(In thousand board feet) ¹

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Shortleaf pine	9,754	--	3,275	6,479	--	--	--	--	--
Other yellow pines	--	--	--	--	--	--	--	--	--
Baldcypress	--	--	--	--	--	--	--	--	--
Eastern redcedar	645	645	--	--	--	--	--	--	--
Other softwoods	--	--	--	--	--	--	--	--	--
Total	10,399	645	3,275	6,479	--	--	--	--	--
Hardwoods									
Select white oak	176,451	--	39,038	45,518	38,810	26,198	15,206	10,999	682
Other white oak	66,828	--	26,020	23,076	10,958	4,917	1,026	597	234
Select red oak	18,121	--	3,775	3,190	5,684	2,708	1,013	1,348	403
Other red oak	129,066	--	29,349	27,333	32,013	17,327	11,925	10,645	474
Select hickory	18,035	--	7,148	8,820	1,472	--	--	595	--
Other hickory	19,335	--	4,437	10,212	3,956	730	--	--	--
Basswood	--	--	--	--	--	--	--	--	--
Beech	--	--	--	--	--	--	--	--	--
Hard maple	6,023	--	1,311	2,904	--	1,808	--	--	--
Soft maple	3,062	--	--	--	--	872	648	1,542	--
Elm	3,903	--	983	1,276	--	690	--	954	--
Ash	7,452	--	3,055	2,420	638	622	717	--	--
Sycamore	2,212	--	--	1,045	515	--	--	652	--
Cottonwood	--	--	--	--	--	--	--	--	--
Willow	--	--	--	--	--	--	--	--	--
Hackberry	466	--	--	--	466	--	--	--	--
Aspen	--	--	--	--	--	--	--	--	--
Birch	586	--	--	--	--	--	--	586	--
Sweetgum	--	--	--	--	--	--	--	--	--
Tupelo	3,065	--	535	667	435	858	--	570	--
Black cherry	--	--	--	--	--	--	--	--	--
Black walnut	4,749	--	1,687	528	1,386	1,148	--	--	--
Butternut	--	--	--	--	--	--	--	--	--
Yellow-poplar	--	--	--	--	--	--	--	--	--
Persimmon	--	--	--	--	--	--	--	--	--
Sassafras	--	--	--	--	--	--	--	--	--
Other hardwoods	4,668	--	--	664	845	2,087	1,072	--	--
Total	464,022	--	117,338	127,653	97,178	59,965	31,607	28,488	1,793
All species	474,421	645	120,613	134,132	97,178	59,965	31,607	28,488	1,793

¹ International 1/4-inch rule.

Table 28.--Net volume of growing stock on timberland by species group and forest type, Eastern Ozarks Unit, Missouri, 1989

(In thousand cubic feet)

Species group	All types	Forest type											
		Short-leaf pine	Eastern redcedar	Eastern redcedar-hardwood	Shortleaf pine - oak	Post-blackjack oak	Black-scarlet oak	White oak	Oak-gum-cypress	Elm-ash-soft maple	Cottonwood	Maple-beech	Non-stocked ¹
Softwoods													
Shortleaf pine	412,941	127,193	--	--	123,309	17,621	97,461	45,045	--	--	--	2,312	--
Other yellow pines	1,581	--	--	--	--	--	--	--	--	--	--	1,581	--
Baldcypress	117	--	--	--	117	--	--	--	--	--	--	--	--
Eastern redcedar	22,369	1,072	4,587	6,656	80	1,944	1,876	2,883	--	744	--	2,527	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	437,008	128,265	4,587	6,656	123,506	19,565	99,337	47,928	--	744	--	6,420	--
Hardwoods													
Select white oak	799,783	9,499	--	2,353	28,316	53,674	280,247	419,033	--	897	--	5,545	219
Other white oak	229,261	5,475	--	1,847	11,394	105,036	87,302	16,332	606	--	--	1,269	--
Select red oak	71,431	--	--	--	1,307	742	40,638	26,000	--	814	--	1,930	--
Other red oak	1,098,469	12,006	54	3,278	64,717	78,290	768,412	162,301	4,631	1,645	--	3,135	--
Select hickory	96,767	383	262	730	1,343	9,408	48,758	31,879	394	378	--	3,232	--
Other hickory	183,425	1,497	--	609	6,564	23,196	95,309	50,956	174	553	--	4,567	--
Basswood	--	--	--	--	--	--	--	--	--	--	--	--	--
Beech	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	19,375	179	--	147	--	219	2,475	7,123	--	--	--	9,232	--
Soft maple	8,105	--	--	--	152	--	794	684	--	5,986	--	489	--
Elm	17,875	206	--	257	574	877	4,687	6,115	162	805	--	4,192	--
Ash	12,664	--	--	476	--	1,466	3,325	2,912	481	2,707	--	1,297	--
Sycamore	39,952	--	257	86	721	741	2,309	10,251	--	19,483	--	6,104	--
Cottonwood	1,968	--	--	--	--	--	--	--	--	1,968	--	--	--
Willow	3,329	--	--	--	--	--	--	--	--	3,329	--	--	--
Hackberry	6,536	--	--	--	--	--	345	141	--	5,326	--	724	--
Aspen	--	--	--	--	--	--	--	--	--	--	--	--	--
Birch	6,274	--	--	--	--	--	833	268	--	4,235	--	938	--
Sweetgum	5,294	928	--	--	--	--	514	2,762	403	--	--	687	--
Tupelo	18,445	365	--	--	137	1,033	10,742	5,912	256	--	--	--	--
Black cherry	2,737	--	--	--	83	--	575	1,187	142	573	--	177	--
Black walnut	15,111	--	--	437	479	333	6,420	4,933	--	127	--	2,382	--
Butternut	387	--	--	--	--	142	--	147	--	--	--	98	--
Yellow-poplar	284	--	--	--	--	--	--	284	--	--	--	--	--
Persimmon	1,048	12	--	83	--	410	389	154	--	--	--	--	--
Sassafras	1,672	340	--	10	499	11	595	217	--	--	--	--	--
Other hardwoods	11,075	130	--	--	764	1,059	5,006	3,131	--	356	--	629	--
Total	2,651,267	31,020	573	10,313	117,050	276,637	1,359,675	752,722	7,249	49,182	--	46,627	219
All species	3,088,275	159,285	5,160	16,969	240,556	296,202	1,459,012	800,650	7,249	49,926	--	53,047	219

¹ Nonstocked with all live trees.

Table 29.--Net volume of sawtimber on timberland by species group and forest type, Eastern Ozarks Unit, Missouri, 1989

(In thousand board feet) ¹

Species group	All types	Forest type											
		Short-leaf pine	Eastern redcedar	Eastern redcedar-hardwood	Shortleaf pine - oak	Post-blackjack oak	Black-scarlet oak	White oak	Oak-gum-cypress	Elm-ash-soft maple	Cottonwood	Maple-beech	Non- ² stocked
Softwoods													
Shortleaf pine	1,551,215	475,209	--	--	446,758	68,161	380,698	172,056	--	--	--	8,333	--
Other yellow pines	4,219	--	--	--	--	--	--	--	--	--	--	4,219	--
Baldcypress	--	--	--	--	--	--	--	--	--	--	--	--	--
Eastern redcedar	49,104	5,730	15,020	8,594	--	845	3,763	8,686	--	3,254	--	3,212	--
Other softwoods	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	1,604,538	480,939	15,020	8,594	446,758	69,006	384,461	180,742	--	3,254	--	15,764	--
Hardwoods													
Select white oak	2,065,696	19,489	--	10,995	65,567	148,438	670,613	1,123,813	--	4,220	--	21,499	1,062
Other white oak	463,499	4,668	--	7,715	16,525	201,604	191,190	37,040	1,599	--	--	3,158	--
Select red oak	236,655	--	--	--	3,200	983	123,270	100,505	--	3,394	--	5,303	--
Other red oak	3,316,332	29,448	--	6,558	180,393	216,842	2,314,671	540,938	12,637	8,032	--	6,813	--
Select hickory	207,244	--	1,281	1,764	1,290	13,261	106,094	72,090	1,912	1,842	--	7,710	--
Other hickory	399,036	--	--	2,504	14,858	51,868	197,449	119,571	870	1,953	--	9,963	--
Basswood	--	--	--	--	--	--	--	--	--	--	--	--	--
Beech	--	--	--	--	--	--	--	--	--	--	--	--	--
Hard maple	38,522	--	--	--	--	--	3,994	15,094	--	--	--	19,434	--
Soft maple	28,195	--	--	--	--	--	845	1,786	--	25,564	--	--	--
Elm	21,611	--	--	--	--	--	8,216	7,768	767	--	--	4,860	--
Ash	32,467	--	--	737	--	6,279	9,285	5,925	787	7,943	--	1,511	--
Sycamore	148,340	--	--	--	3,087	3,378	7,898	31,726	--	81,786	--	20,465	--
Cottonwood	10,069	--	--	--	--	--	--	--	--	10,069	--	--	--
Willow	15,216	--	--	--	--	--	--	--	--	15,216	--	--	--
Hackberry	16,884	--	--	--	--	--	1,229	--	--	15,655	--	--	--
Aspen	--	--	--	--	--	--	--	--	--	--	--	--	--
Birch	18,513	--	--	--	--	--	3,041	1,237	--	14,235	--	--	--
Sweetgum	7,482	--	--	--	--	--	2,372	2,964	--	--	--	2,146	--
Tupelo	40,787	--	--	--	--	2,925	21,994	15,868	--	--	--	--	--
Black cherry	4,708	--	--	--	--	--	977	1,804	--	1,927	--	--	--
Black walnut	30,942	--	--	--	--	--	9,983	12,849	--	622	--	7,488	--
Butternut	673	--	--	--	--	673	--	--	--	--	--	--	--
Yellow-poplar	1,387	--	--	--	--	--	--	1,387	--	--	--	--	--
Persimmon	--	--	--	--	--	--	--	--	--	--	--	--	--
Sassafras	--	--	--	--	--	--	--	--	--	--	--	--	--
Other hardwoods	25,625	--	--	--	--	3,131	12,364	7,842	--	1,030	--	1,258	--
Total	7,129,883	53,605	1,281	30,273	284,920	649,382	3,685,485	2,100,207	18,572	193,488	--	111,608	1,062
All species	8,734,421	534,544	16,301	38,867	731,678	718,388	4,069,946	2,280,949	18,572	196,742	--	127,372	1,062

¹ International 1/4-inch rule.² Nonstocked with all live trees.

Leatherberry, Earl C.

1990. **Timber resource of Missouri's Eastern Ozarks.** Resour. Bull. NC-115. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 48 p.

In 1989 the fourth forest inventory of the Eastern Ozarks found 4.3 million acres of forest land, of which 4.1 million acres (96 percent) was timberland. This bulletin presents highlights and statistics on area, volume, growth, removals, mortality.

KEY WORDS: Area, volume, growth, removals, mortality.

Our job at the North Central Forest Experiment Station is creating, evaluating, and disseminating information and technology to improve management and use of our natural resources.

As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.

